SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Computers and Information Technology**
1.4 Field of study	**Computers and Information Technology**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Computers / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject		**Applied Informatics I**					
2.2 Holder of the subject		**Pater Alexandrina Mirela**					
2.3 Holder of the academic seminar/laboratory/project		**Todor Meda**					
2.4 Year of study	I	2.5 Semester	1	2.6 Type of the evaluation	Vp	2.7 Subject regime	FD - Fundamental Discipline

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	0/2/0
3.4 Total of hours from the curriculum	56	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	0/28/0

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	28
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	14
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	21
Tutorials	2
Examinations	4
Other activities.	

3.7 Total of hours for individual study	**69**
3.9 Total of hours per semester	**125**
3.10 Number of credits	5

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions)
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	Classroom equipped with video projector and computer. The course can be held face to face or online.

5.2.for the development of the academic seminary/laboratory/project	Laboratory equipped with computers that are connected to the Internet. The laboratory / project can be held face to face or online
6. Specific skills acquired	
Professional skills	CP1. Operating with scientific, engineering and informational fundaments CP3. Solving problems using computer science and engineering instruments
Transversal skills	CT1. Honorable, responsibleand ethical behavior, respecting the spirit of the law, to ensure the reputation of the profession.

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	The course and the laboratory aim to familiarize students with computer science, computer systems and computer systems. Types of computer and information systems, methods of representation and processing of information, design and writing of an algorithm and the corresponding logic scheme are presented. It presents the general and functional hardware structure of a computer system, as well as the general architecture of an operating system. Archiving / unarchiving programs and virus / antivirus programs and internet communications are also presented.
7.2 Specific objectives	**Theoretical knowledge:** • Information systems, informatics • Information representation, numbering systems • Understand and know the techniques for designing and implementing a problem-solving algorithm using pseudocode and logic diagrams • Description of the structure and operation of hardware, software and communications components • Explaining the role, interaction and operating principles of the components of hardware, software and communication systems • Carrying out projects on areas of knowledge **Skills acquired:** • To understand the basic principles of the operation of a computer system, knowing its main components. • To solve various problems using the design and implementation techniques of a problem solving algorithm using pseudocode and logic diagrams

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
Chapter 1. Information systems. Computer systems	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Chapter 2. Arithmetic basics of computers.	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Chapter 3. Algorithms	Powerpoint presentation with the help of the video	6 hours

	projector; free discussions;	
Chapter 4. Computing Systems	Powerpoint presentation with the help of the video projector; free discussions;	8 hours
Chapter 5. Computer networks	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Chapter 6. Operating systems	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Chapter 7. Utility programs	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Chapter 8. The internet. Internet services	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Chapter 9. Principles of program design	Powerpoint presentation with the help of the video projector; free discussions;	2 hours

Bibliography

- Behrouz Forouzan, *Foundation of Computer science*, forth edition, Cencage Learning, EMEA, 2020
- Behrouz Forouzan, *Foundation of Computer science*, third edition, Cencage Learning, EMEA, 2014
- Dorian Gorgan, Gheorghe Sebestyen, *Structura Calculatoarelor*, Ed. Albastra, Cluj-Napoca, 2000
- Grigore Albeanu, *Sisteme De Operare*, Editura Petrion, Bucureşti, 1996
- Radu Mârşanu, *Sisteme De Calcul*, Editura Teora, Bucureşti, 1996
- Emanuela Cerchez, Marinel Şerban, *Sisteme De Calcul*, Bucureşti 1998
- J. Glenn Brookshear, *Introducere În Informatica,* Editura Teora, Bucureşti 1998
- Microsoft Corporation, *Microsoft Office*
- Mirela Pater, *Introducere În Ştiinţa Calculatoarelor,* Editura Universităţii Din Oradea, Oradea, 2001
- Mirela Pater, *Introducere În Ştiinţa Sistemelor De Calcul,* Editura Universităţii Din Oradea, Oradea, ISBN 978-973-759-494-5, 266 pag., 2008
- Mirela Pater, *Introducere În Ştiinţa Sistemelor De Calcul,* format electronic, 2013

https://uoradea-my.sharepoint.com/personal/alexandrina_pater_didactic_uoradea_ro/Documents/ISSC%20editie%20electronica%202013.pdf

8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
Labor protection training Computer network overview, input / output commands in / from the network. Presentation and	Powerpoint presentation with the help of the video	2 hours

use of disk structure, directory and file concepts, password setting command for the current directory	projector; free discussions;	
Numbering systems	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Algorithms. Logical schemes and pseudocode language	Powerpoint presentation with the help of the video projector; free discussions;	10 hours
Realization of technical editing and editing project	Powerpoint presentation with the help of the video projector; free discussions;	12 hours
Test	Powerpoint presentation with the help of the video projector; free discussions;	2 hours

Bibliography

- Behrouz Forouzan, *Foundation of Computer science*, forth edition, Cencage Learning, EMEA, 2020
- Behrouz Forouzan, *Foundation of Computer science*, third edition, Cencage Learning, EMEA, 2014
- Dorian Gorgan, Gheorghe Sebestyen, *Structura Calculatoarelor*, Ed. Albastra, Cluj-Napoca, 2000
- Grigore Albeanu, *Sisteme De Operare*, Editura Petrion, Bucureşti, 1996
- Radu Mârşanu, *Sisteme De Calcul*, Editura Teora, Bucureşti, 1996
- Emanuela Cerchez, Marinel Şerban, *Sisteme De Calcul*, Bucureşti 1998
- J. Glenn Brookshear, *Introducere În Informatica,* Editura Teora, Bucureşti 1998
- Microsoft Corporation, *Microsoft Office*
- Mirela Pater, *Introducere În Ştiinţa Calculatoarelor,* Editura Universităţii Din Oradea, Oradea, 2001
- Mirela Pater, *Introducere În Ştiinţa Sistemelor De Calcul,* Editura Universităţii Din Oradea, Oradea, ISBN 978-973-759-494-5, 266 pag., 2008
- Mirela Pater, *Introducere În Ştiinţa Sistemelor De Calcul,* format electronic, 2013

https://uoradea-my.sharepoint.com/personal/alexandrina_pater_didactic_uoradea_ro/Documents/ISSC%20editie%20electronica%202013.pdf

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

The content of the discipline contributes to the acquisition of the principles of the elaboration of the programs for the parallel calculation.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the	Written paper The evaluation can be done face to face or online	50%

	minimum performance standard For 10: KnowledgeUnderstanding		
10.5 Academic seminar	-		
10.6 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard For 10:Knowledge and understanding;Ability to explain and interpret;Complete and correct solution of the requirements.	- Laboratory / practical works -Tests during the semester The evaluation can be done face to face or online	50%
10.7 Project			
10.8 Minimum performance standard: Course: 1.To solve well a minimum of topics -questions and applications 2.Minimum grade 5 in the laboratory Academic seminar:- Laboratory: 1.The student knows the main concepts, recognizes them, defines them correctly and builds a simple application; 2. The programming language is used correctly; 3.To solve well a minimum of topics -questions and applications Project:-			

Completion date: 15.09.2023

Cours instructor Conf.dr.ing. Mirela Pater

Date of endorsement in the department: 27.09.2023

Dean: Prof.dr.ing.habil. Francisc Hathazi

Date of endorsement in the Faculty Board: 29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Computers and Information Technology**
1.4 Field of study	**Computers and information technology**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Information Technology / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject		**Applied informatics II**					
2.2 Holder of the subject		Associate professor dr. Elisa Valentina MOISI					
2.3 Holder of the academic seminar/laboratory/project		Associate professor dr. Elisa Valentina MOISI					
2.4 Year of study	I	2.5 Semester	2	2.6 Type of the evaluation	Vp - Continuous Assessment	2.7 Subject regime	FD - Field Discipline

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	2
3.4 Total of hours from the curriculum	56	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	28
Distribution of time					hours
Study using the manual, course support, bibliography and handwritten notes					27
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					8
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					28
Tutorials					2
Examinations					4
Other activities.					

3.7 Total of hours for individual study	**69**
3.9 Total of hours per semester	**125**
3.10 Number of credits	5

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions)
4.2 related to skills	Programming logics, average language programming skills

5. Conditions (where applicable)

5.1. for the development of the course	Classroom with laptops and video projector The course can be held face-to-face or online.
5.2.for the development of the academic seminary/laboratory/project	Laboratory room equipped with networked computers, internet connection and adequate software The laboratory can be carried out face to face or online

6. Specific skills acquired	
Professional skills	CP1. Operating with scientific, engineering and informational fundaments CP3. Solving problems using computer science and engineering instruments
Transversal skills	CT1. Honorable, responsible and ethical behavior, respecting the spirit of the law, to ensure the reputation of the profession. CT2. Identification, description and implementation of project management processes, by taking different team roles, together with a clear and concise verbal and written description, in Romanian and an international language , of the results of the activity CT3. Demonstration of initiative and action for updating professional, economic knowledge and organizational culture.

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ Formation of algorithm design skills in parallel with demonstrating their correctness ▪ Training in the design of the correct programs from the specifications ▪ Forming a modern style of programming ▪ Development of software components using data structures, algorithms, techniques, and evolved programming languages
7.2 Specific objectives	▪ Students will learn core programming basics—including data types, control structures, algorithm development, and program design with functions—via the Python programming language. ▪ Students will learn the fundamental principles of Object-Oriented Programming, as well as in-depth data and information processing techniques. ▪ Students will problem solve, explore real-world software development challenges, and create practical and contemporary applications using graphical user interfaces and graphics.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
Introduction to Computers and Programming	Presentation, description, explanations, examples, dialogue	2
Software Development, Data Types, and Expressions		2
Decision and Repetition Structures		2
Design with Functions. Recursion		2
Files and Exceptions		2
List and Tuples		2
Strings		2
Dictionaries and Sets		2
Design with Classes		2
Inheritance		2
GUI Programming		2
Simple Graphics		2
Pythonic programming		2
Summary and final discussions		2
Bibliography 1. Starting Out with Python, 4/E, Tony Gaddis, Haywood Community College, published by Pearson Education © 2018, ISBN 978-0-13-444432-1 2. Fundamentals of Python: First Programs, 2nd Edition, Author: Kenneth Lambert, Publisher: Cengage Learning, 2018, ISBN-13: 978-1-337-56009-2		
8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
1-14. Practical aspects based on the topics discussed in the course	Participatory laboratory, students writing code, group work,	28

	dialogue, demonstration, questions, functionality testing	

Bibliography

1. Starting Out with Python, 4/E, Tony Gaddis, Haywood Community College, published by Pearson Education © 2018, ISBN 978-0-13-444432-1
2. Fundamentals of Python: First Programs, 2nd Edition, Author: Kenneth Lambert, Publisher: Cengage Learning, 2018, ISBN-13: 978-1-337-56009-2

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline is consistent with what is done in other university centers abroad.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard	Written paper	50%
10.5 Academic seminar			
10.6 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard	- Laboratory / practical works - final test	50%
10.7 Project			

10.8 Minimum performance standard:

Course:

1. To solve well a minimum of topics -questions and applications
2. Minimum grade 5 in the laboratory

Academic seminar: -

Laboratory:

1. The student knows the main concepts, recognizes them, defines them correctly and builds a simple application;
2. The programming language is used correctly;
3. To solve well a minimum of topics -questions and applications

Project: -

Completion date: 15.09.2023

Date of endorsement in the department: 27.09.2023

Date of endorsement in the Faculty Board: 29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	Department of Computers and Information Technology
1.4 Field of study	Computers and information technology
1.5 Study cycle	Bachelor
1.6 Study program/Qualification	Computers/ Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject				**Computer programming and programming languages I**			
2.2 Holder of the subject				**Prof. dr. ing. Győrödi Cornelia Aurora**			
2.3 Holder of the academic seminar/laboratory/project				Sef. Lucr. Dr. Inf. Bolojan Octavia Sef. Lucr. Dr. Inf. Costea Mirabela			
2.4 Year of study	I	2.5 Semester	1	2.6 Type of the evaluation	Ex	2.7 Subject regime	FD

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	0/2/0
3.4 Total of hours from the curriculum	56	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	0/28/0

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	14
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	14
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	30
Tutorials	7
Examinations	4
Other activities.	

3.7 Total of hours for individual study	**69**
3.9 Total of hours per semester	**125**
3.10 Number of credits	5

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions)
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	Classroom equipped with video projector and computer - The course can be held face to face or online
5.2.for the development of the academic seminary/laboratory/project	Laboratory equipped with computers that have installed DevC ++, Visual Studio 2019 and those are connected to the internet. The laboratory can take place face to face or online

6. Specific skills acquired	
Professional skills	C2. Designing hardware, software and communication components Fundamental concepts regarding structured programming in the C language.
Transversal skills	

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ Learning the basics of structured programming in the C language and training the skills needed to design high-performance and portable software.
7.2 Specific objectives	▪ Acquiring knowledge in the C language for writing programs that use a variety of data types specific to programming problems, use language modularization facilities, use different program control structures, use vectors and pointers to solve problems effectively, including structured data types in the solution of the problem. You will create their own data types and use functions from the C language libraries, as well as functions working with files.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
CHAPTER.1. Introduction - Structured programming - Representation by logical schemes of algorithms	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
CHAPTER.2. Introduction to programming in the C language		2 hours
CHAPTER.3. Structured programming in the C language		2 hours
CHAPTER.4. Control structures in the C language		2 hours
CHAPTER.5. Variables, operators and expressions in the C language		2 hours
CHAPTER.6. Functions		2 hours
CHAPTER 7. Arrays		2 hours
CHAPTER 8. Pointers		2 hours
CHAPTER 9. Characters and Strings		2 hours
CHAPTER 10. Structures, Unions, Bit Manipulations, and Enumerations		2 hours
CHAPTER 11. Recursion. Dynamic structures		2 hours
CHAPTER 12. Input/Output (I/O) functions for files		4 hours

Bibliography

1. **Győrödi Cornelia,** Győrödi Robert**,** Pecherle George, "*Programarea în limbajul C. Teorie și Aplicații*", Editura Universității din Oradea, 2015, ISBN 978-606-10-1522-1, nr. pag 250.
2. H.M. Deitel, P.J. Deitel , *C How to Program, With Case Studies Introducing Applications and Systems Programming, 9th edition,* ISBN-13: 9780137454372, 2021, Editura Pearson

<table>
<tr><td colspan="3">
3. H.M. Deitel, P.J. Deitel, C How to Program 8th edition, 2016, Editura Pearson, link: C: How to Program 8th Edition – H.M. Deitel, P.J. Deitel – 2016, Pearson – ISBN 978-0133976892
4. Programming: Principles and Practice Using C++ (2nd Edition), Bjarne Stroustrup, May 25, 2014, Addison-Wesley, ISBN - 978-0321992789.
5. The Joy of C 3rd Edition – L.H. Miller, A.E. Quilici – 1997 Wiley – ISBN 047112933x
6. Data Structures, Algorithms & Software Principles in C – Thomas A. Standish – 1995 Addison-Wesley – ISBN 0201591189
7. Cursul in format electronic poate fi accesat de pe platforma e.uoradea.ro de la adresa https://e.uoradea.ro/course/view.php?id=20604
</td></tr>
<tr><td>8.2 Academic laboratory</td><td>Teaching methods</td><td>No. of hours/ Observations</td></tr>
<tr><td>1. Presentation of the DevC ++ programming environment. Writing algorithms using logic schemes.</td><td rowspan="13">Oral presentation

The students work with the Dev-C ++ programming environment (or alternatives such as Code Blocks, Visual C ++, etc.)
The materials (courses and laboratories) are posted on an elearning platform, available at http://e.uoradea.ro, where students have access by username and password. Also, by the online platform, they send the solved assignments from each laboratory.

The students are assessed by a practical test using computer from laboratory topics.</td><td>2 hours</td></tr>
<tr><td>2. Introduction to programming in the C language. Writing a program in the C language. Debug of programs. Important errors. Header files, project files.</td><td>2 hours</td></tr>
<tr><td>3. The Selection statements.</td><td>2 hours</td></tr>
<tr><td>4. Control structures in the C language. The Repetitive statements: for, while, do / while. The Break and continue statements.</td><td>2 hours</td></tr>
<tr><td>5. Variables, operators and expressions in the C language</td><td>2 hours</td></tr>
<tr><td>6. Functions</td><td>2 hours</td></tr>
<tr><td>7. Arrays</td><td>2 hours</td></tr>
<tr><td>8. Pointers</td><td>2 hours</td></tr>
<tr><td>9. Characters and Strings</td><td>2 hours</td></tr>
<tr><td>10. Structures, Unions, Bit Manipulations, and Enumerations</td><td>2 hours</td></tr>
<tr><td>11. Recursion. Dynamic structures</td><td>2 hours</td></tr>
<tr><td>12. Input/Output (I/O) functions for files</td><td>4 hours</td></tr>
<tr><td>13. Final test</td><td>2 hours</td></tr>
<tr><td colspan="3">Bibliography

1. H.M. Deitel, P.J. Deitel , C How to Program, With Case Studies Introducing Applications and Systems Programming, 9th edition, ISBN-13: 9780137454372, 2021, Editura Pearson
2. Győrödi Cornelia Aurora - “Programare în limbajul C” – Indrumător de laborator în format electronic, 2019
3. C: How to Program 8th Edition – H.M. Deitel, P.J. Deitel – 2016, Pearson – ISBN 978-0133976892
4. Programming: Principles and Practice Using C++ (2nd Edition), Bjarne Stroustrup, May 25, 2014, Addison-Wesley, ISBN - 978-0321992789.
5. Győrödi Cornelia, Győrödi Robert, Pecherle George, “Programarea în limbajul C. Teorie și Aplicații”, Editura Universității din Oradea, 2015, ISBN 978-606-10-1522-1, nr. pag 250.
6. https://e.uoradea.ro/course/view.php?id=6127

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</table>

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

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10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard: 50% of the subjects from the final exam should be correctly solved	Semester exam – written	66%

	For 10: 100% of the subjects from the final exam should be correctly solved		
10.5 Academic seminar	Minimum required conditions for passing the examination (grade 5): in accordance with the minimum performance standard - For 10:	-	-
10.6 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard: 50% of the problems from the final laboratory test should be correctly solved - For 10: 100% of the problems from the final laboratory test should be correctly solved	Oral/written	34%
10.7 Project			
10.8 Minimum performance standard: Course: 50% yield by summing scores from the final exam Academic seminar: Laboratory: 50% yield by summing scores from the laboratory test Project:			

Course instructor

Head of department

Completion date:
25.09.2023

prof. dr. ing. Cornelia Győrödi
E-mail: cgyorodi@uoradea.ro

conf. dr. ing. Pater Mirela

Date of endorsement in the department:
27.09.2023

Date of endorsement in the Faculty Board:
29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	Computers and Information Technology
1.4 Field of study	Computers and Information Technology
1.5 Study cycle	Bachelor
1.6 Study program/Qualification	Computers/Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject	**Computer Programming and Programming Languages II**						
2.2 Holder of the subject	s.l.dr.ing. Simina COMAN						
2.3 Holder of the academic seminar/laboratory/project	s.l.dr.ing. Simina COMAN						
2.4 Year of study	**I**	2.5 Semester	**II**	2.6 Type of the evaluation	**Ex**	2.7 Subject regime	**FD**

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**4**	of which: 3.2 course	**2**	3.3 academic seminar/laboratory/project	**2**
3.4 Total of hours from the curriculum	**56**	Of which: 3.5 course	**28**	3.6 academic seminar/laboratory/project	**28**

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	23
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	15
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	23
Tutorials	2
Examinations	6
Other activities.	

3.7 Total of hours for individual study	**69**
3.9 Total of hours per semester	**125**
3.10 Number of credits	**5**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions)
4.2 related to skills	C language programming skills

5. Conditions (where applicable)

5.1. for the development of the course	- classroom equipped with computer and video projector - presentation based on slides - attendance of at least 50% of the courses
5.2.for the development of the academic seminary/laboratory/project	-laboratory room equipped with computers, C / C ++ (Visual Studio / DevC ++ / MinGW) - mandatory presence at all laboratories;

	- a maximum of 4 works can be recovered during the semester (30%); - the frequency of laboratory hours below 70% leads to the restoration of the discipline
6. Specific skills acquired	
Professional skills	**CP1**. Operating with scientific, engineering, and informational fundaments **CP3.** Solving problems using computer science and engineering instruments
Transversal skills	

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ Continuing the programming elements started in the previous semester, the course aims to familiarize students with a series of advanced programming techniques and concepts that allow the design and development of programs with a high degree of complexity. ▪ The course has a strong applicative character, in order to deepen the practical programming skills of students, containing a large number of examples of algorithms in source format, but without restricting the generality of the concepts presented.
7.2 Specific objectives	▪ The course aims to present advanced programming techniques and concepts together with specific methods and algorithms, which allow the design and implementation of complex programs, in order to solve different types of applications: advanced manipulation of arrays, files, strings, along with a series of algorithms known in the field. A separate chapter addresses, for example, the issue of recursion. Are also presented fundamental notions of evaluating the performance of algorithms, exemplified by comparative evaluations as well as the design and implementation of complex programs. ▪ The laboratory, made using C ++ language, familiarizes students with practical aspects of solving different types of problems by implementing and adapting specific algorithms and data types ▪

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Introduction 1.1. Data types and structures 1.1.1. Static data types 1.1.2. Dynamic data types 1.2. Evaluation of algorithm performance - concepts used, notation O (n)	Free exposure, with the presentation of the course on the video projector and on the board	2h
2. Strings 2.1. Generalities. 2.2. Functions 2.3 String search techniques 2.3.1Direct Search	Free exposure, with the presentation of the course on the video	2h

2.3.2 The Boyer-Moore Search	projector and on the board	
3 Search and Sort Algorithms for Static Data Structures 3.1. Search algorithms in arrays 3.1.1. The flag technique 3.1.2. Binary search 3.1.3 High-performance binary search 3.1.4 Search by interpolation 3.2. Algorithms for sorting arrays 3.2.1. Direct sorting methods 3.2.1.1. Insertion sorting technique 3.2.1.2. Selection sorting technique 3.2.1.3. Interchange sorting technique 3.2.2. Advanced sorting methods 3.2.2.1. Insertion sorting technique with decreasing increment (Shellsort) 3.2.2.2. The technique of sorting trees by Heapsort method 3.2.2.3. Quicksort sorting technique 3.2.3. Sorting sequential files (external sorting) 3.2.3.1. Interclass sorting technique 3.2.3.2. The technique of sorting by natural interclassing	Free exposure, with the presentation of the course on the video projector and on the board	2h 2h 2h 2h
4. Recursive Algorithms 4.1. Generalities. 4.2. Recursive algorithms. Examples 4.2.1. Division algorithms 4.2.2. Recursive algorithms for determination of all solutions to a problem 4.2.3. Backtracking algorithms 4.2.4. Algorithms for determination of optimum (knapsack problem)	Free exposure, with the presentation of the course on the video projector and on the board	2h 2h 2h
5. List Data Structure 5.1 List implementation techniques 5.1.1. Implementing lists using the table type 5.1.2. Implementing lists using the pointer type 5.1.2.1. Creating chained lists. Insert a node in a chained list 5.1.2.2. Delete nodes from a chained list 5.1.2.3. Crossing a chained list 5.1.3. Comparison between the methods of implementing the lists based on the array type and on the pointer type 5.2. Variants of the list structure 5.2.1. Ordered lists. Using the flag technique in the list structure. Reorder list search 5.2.2.Double-stranded lists 5.2.3. Stacks 5.2.4. Queues	Free exposure, with the presentation of the course on the video projector and on the board	2h 2h 2h 2h
6. Dispersion Technique 6.1. The principle of dispersion technique 6.2. Determination of dispersion function. Treating the collision situation	Free exposure, with the presentation of the course on the video projector and on the board	2h
Bibliography 1. http://www.cprogramming.com/		

2. http://www.algolist.net/Algorithms/

3. P.J.Deitel, H.M. Deitel, *C: How to program*, Pearson Education International, ISBN 0-13-239300-X, Fifth Edition, 2007

4. D. Knuth, *Arta programarii calculatoarelor*, volumul 3 - Sortare si cautare, Editura Teora, 2004

5. D. Zmaranda - *Algoritmi şi tehnici de programare*, Editura Universităţii din Oradea, ISBN 973-613-062-2, 264 pg., 2001, versiune electronică actualizată 2014, https://uoradea-my.sharepoint.com/personal/rodica_zmaranda_didactic_uoradea_ro/Documents/PCLPIII/PCLP_III.pdf https://uoradea-my.sharepoint.com/personal/rodica_zmaranda_didactic_uoradea_ro/Documents/SDD/Structuri_de_date.pdf

6.V. Creţu, *Structuri de date şi algoritmi – vol. 1: Structuri de date fundamentale*, Editura Orizonturi Universitare Timisoara, ISBN 973-9400-74-4, 2000

8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
1. Determining the execution time of a program	Students receive lab themes at least a week in advance, and study them (problems at the end of the lab). At the beginning of the laboratory, the ways of solving the proposed applications are discussed. Then, the students carry out the practical part of the paper (the proposed problems) under the guidance of the teacher.	2 h
2. Search techniques in arrays		2 h
3. Data type string. Functions. Character search techniques		2 h
4. Direct sorting techniques of arrays		2 h
5. Advanced array sorting techniques		2 h
6. Sorting sequential files		2 h
7. Recursion - recursive algorithms		2 h
8. Recursion - backtracking		2 h
9. List data structure		2 h
10. Ordered lists. Using the flag technique in the list structure. Double chained lists		2 h
11. Stacks and tails		2 h
12. Dispersion technique		2 h
13. Handing over the works, concluding the situation at the laboratory		2 h
14. Recovery		2 h

Bibliography

1. Doina Zmaranda, Marius Bonaciu, Coman Simina - - *Algoritmi şi tehnici de programare* – îndrumător de laborator, volumul I , Editura Universităţii din Oradea, Editie revizuita, ISBN: 978-606-10-1895-6, 90 pg., versiune electronica, 2017

2. D. Zmaranda, Bonaciu Marius - *Algoritmi şi tehnici de programare* – îndrumător de laborator, volumul I , Editura Universităţii din Oradea, ISBN 973-613-302-8, 100 pg., 2003, versiune electronică actualizată 2014, https://uoradea-my.sharepoint.com/personal/rodica_zmaranda_didactic_uoradea_ro/Documents/PCLPIII/Laborator_PCLPIII.pdf

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline is found in the curriculum of Computer specialization of other university centers that have accredited these specializations ("Polytechnic" University of Timisoara, Bucharest Polytechnic); knowledge of data types and algorithms presented in this discipline is a fundamental requirement in the purpose of training the necessary basic programming skills and abilities

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark

10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard - For 10: the correct answer is required for all topics in the grid	Written exam Students each receive a form with 18 theory topics, grid type	50%
10.5 Academic seminar	Minimum required conditions for passing the examination (grade 5): in accordance with the minimum performance standard - For 10:		
10.6 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard - For 10: detailed knowledge of how to implement all laboratory work	Practical application At each laboratory, students are evaluated based on the activity (answers to questions, implementation proposals, etc.), evaluations that materialize at the end of the laboratory in a note on the laboratory activity during the semester. Also, in the last hour of the laboratory, the students complete and handle to the teacher all the practical applications proposed in the laboratory. The average between the grade received for the practical applications and the grade from the laboratory activity will represent the final grade at the laboratory	50%
10.7 Project			
10.8 Minimum performance standard: Course: Acquiring knowledge of: the performance of an algorithm, array search techniques, recursion, list data structures Academic seminar: Laboratory: • knowledge of the way of analytical evaluation of the performances of an algorithm, comparative evaluation of the performances of simple algorithms • Understanding the programming techniques used in array search methods as well as direct and advanced sorting methods of arrays and files and applying search and sorting methods in various program categories • Understanding the mechanism of recursion, familiarization with the main types of recursive algorithms and application of various types of recursive algorithms in specific applications; handling of self-			

referenced structures (lists)
• advanced knowledge of how to manipulate strings and specific string search algorithms
Project:

Completion date: 15.09.2023

Date of endorsement in the department: 27.09.2023

Date of endorsement in the Faculty Board: 29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Computers and Information Technology**
1.4 Field of study	**Computers and Information Technology**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**COMPUTERS** / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject	**LOGIC DESIGN I**						
2.2 Holder of the subject	**As. Prof. PhD eng. Ovidiu-Constantin NOVAC**						
2.3 Holder of the academic seminar/laboratory/project	**As. Prof. PhD eng. Ovidiu-Constantin NOVAC**						
2.4 Year of study	**I**	2.5 Semester	**1**	2.6 Type of the evaluation	**Exam**	2.7 Subject regime	**DD –** Domain Discipline

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**3**	of which: 3.2 course	**2**	3.3 academic seminar/laboratory	0/**1**/0
3.4 Total of hours from the curriculum	**42**	Of which: 3.5 course	**28**	3.6 academic seminar/laboratory	0/**14**/0

Distribution of time	58 hours
Study using the manual, course support, bibliography and handwritten notes	28
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	12
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	12
Tutorials	
Examinations	6
Other activities.	

3.7 Total of hours for individual study	**58**
3.9 Total of hours per semester	**42**
3.10 Number of credits	**4**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	-
4.2 related to skills	-

5. Conditions (where applicable)

5.1. for the development of the course	The course can be held face-to-face or online. The course takes place with the modern techniques available: laptop, video projector, whiteboard or on specialized platforms for online courses (Moodle: e.uoradea.ro, Microsoft Teams).
5.2. for the development of the academic seminary/laboratory/project	The laboratory can be held face-to-face or online. The laboratory works are performed using the modern means of work existing in the laboratory: Personal computers, software programs, web browsers. Students presence to all laboratory hours is compulsory. Only one laboratory work can be recovered during the semester.

6. Specific skills acquired	
Professional skills	C2. Advanced hardware and software design of computing systems. ▪ Working with mathematical, engineering and informatics fundamentals. ▪ Design of hardware components ▪ Solving problems using the tools of computer science and engineering ▪ Improving the performance of hardware systems
Transversal skills	CT1. Honorable, responsible, ethical behavior in the spirit of the law to ensure the reputation of the profession

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	• Introduction to Boolean algebra; • Initiation in the analysis and synthesis of the main categories of combinational circuits. Initiation into the theory and practice of logical devices and circuits; • Acquiring the practical skills necessary for the analysis of logic schemes, the logical design of some combinational circuits that are the basis of the complex architectures of computing systems;
7.2 Specific objectives	Using the computer for the purpose of circuit design, functional verification of the designed scheme.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
CHAPTER 1. Boolean algebra. Its application to the study of switching circuits. Definition of Boolean algebra. The inverter circuit. The transfer function of a switching circuit. Operations with functions. Disjunctive regular expression. The normal conjunctive expression. Complete operating systems. Modes of representation. Dual expressions. Boolean function classes. Autodual functions.	Interactive lecture + video projector / Online	4
CHAPTER 2 Minimization of switching functions. The minimization method using the axioms and theorems of Boolean algebra. The method of minimization diagrams. Disjunctive minimal form. Conjunctive minimal form. Using the diagram method to minimize incompletely defined switching functions. Minimization of functions with more than four variables. Condensation of minimization diagrams. The Quine-Mc Cluskey method. Minimization of Boolean function systems.	Interactive lecture + video projector / Online	8
CHAPTER 3. Analysis of combinational circuits with gates or logic elements. Synthesis of combinational circuits with gates or logic elements. Analysis of logic networks with AND-NOT or OR-NOT circuits. Synthesis of networks with logical elements. Synthesis of networks with two levels. Synthesis of two-level networks with AND-NOT elements.	Interactive lecture + video projector / Online	2

Synthesis of circuits with OR-NOT elements. Synthesis with AND-OR-NOT logic circuits.		
CHAPTER 4. Examples of combinational logic circuits. The adding circuit for a rank. Adder for multiple ranks. The selector circuit (multiplexer). The distribution circuit (demultiplexer). The code converter. The decoder. The Encoder. Numerical comparators. Parity detector and generator. Programmable logical areas. Minimization of programmable logical areas.	Interactive lecture + video projector / Online	6
CHAPTER 5. Sequential circuits. Elementary sequential circuits. RS synchronous CBB. Synthesis of the toggle circuit D with synchronous RS. Bistable J-K circuit. Bistable circuit J-K "MASTER - SLAVE". The synthesis of some sequential circuits	Interactive lecture + video projector / Online	4
CHAPTER 6. Counters. Asynchronous counter modulo 2n. Asynchronous counter modulo M ≠ 2n. Synchronous counters. Synchronous binary decimal counter. Reversible counter. Counter without asynchronous inputs.	Interactive lecture + video projector / Online	4

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3. Mang Gerda Erica, ppt. – slide-uri, 2012
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5. John M. Yarbrough, Digital Logic – Applications and Design, West Publishing Company, 1997
6. Erica Mang, Ovidiu Novac, Rodica Ţirtea - Analiza şi sinteza dispozitivelor numerice. Circuite secvenţiale. Îndrumător de laborator- Editura Universităţii Oradea, 52 pag, (versiune electronică - actualizată în 01.10.2022)
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7. Erica Mang, Ovidiu Novac, Mihaela Novac - Analiza şi sinteza dispozitivelor numerice. Circuite combinaţionale. Îndrumător de laborator- Editura Universităţii din Oradea, 83 pag., (versiune electronică - actualizată în 01.10.2022),
https://uoradea-my.sharepoint.com/personal/ovidiu_novac_didactic_uoradea_ro/_layouts/15/start.aspx#/Documents/Forms/All.aspx#InplviewHash91928fea-9b64-429c-9b47-11ef26725031=RootFolder%3D%252Fpersonal%252Fovidiu%255Fnovac%255Fdidactic%255Fuoradea%255Fro%252FDocuments%252FAnaliza%2520si%2520Sinteza%2520Dispozitivelor%2520Numerice
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https://e.uoradea.ro/course/view.php?id=54749

9. Ovidiu Novac – Proiectare Logica I, 2022, Curs, Laborator si Seminar, platforma Teams – materiale didactice https://teams.microsoft.com/_#/school/FileBrowserTabApp/General?threadId=19:BwVzEyFT5ydECzg07uHPlZVvX9saAYHy6TbMO7B2i7M1@thread.tacv2&ctx=channel		
8.2 Laboratory	Teaching methods	No. of hours/ Observations
1. Presentation of the Xilinx program. Realization of a device for choosing the optimal road.	Introductory lecture; free and individual discussions; implementation of proposed programs.	2
2. One-bit adder circuit.	Introductory lecture; free and individual discussions; implementation of proposed programs.	2
3. 8-bit adder.	Introductory lecture; free and individual discussions; implementation of proposed programs.	2
4. 7-segment decoder.	Introductory lecture; free and individual discussions; implementation of proposed programs.	2
5. Multiplexer circuit.	Introductory lecture; free and individual discussions; implementation of proposed programs.	2
6. Code converter.	Introductory lecture; free and individual discussions; implementation of proposed programs.	2
7. Parity generator	Introductory lecture; free and individual discussions; implementation of proposed programs.	2

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2. Mang Gerda Erica, Analiza si Sinteza circuitelor logice – Circuite combinationale. ISBN: 978-606-10-13478-4, 2014
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4. Dave Van den Bout, Practical Xilinx Designer Lab Book, Prentice Hall, 1997
5. Xilinx, Lab Projects Documentation, Foundation Series Express, Documentatie Xilinx, 1998
6. Erica Mang, Ovidiu Novac, Rodica Ţirtea - Analiza şi sinteza dispozitivelor numerice. Circuite secvenţiale. Îndrumător de laborator- Editura Universităţii Oradea, 52 pag, (versiune electronică - actualizată în 01.10.2022)
https://uoradea-my.sharepoint.com/personal/ovidiu_novac_didactic_uoradea_ro/_layouts/15/start.aspx#/Documents/Forms/All.aspx#InplviewHash91928fea-9b64-429c-9b47-

11ef26725031=RootFolder%3D%252Fpersonal%252Fovidiu%255Fnovac%255Fdidactic%255Fuoradea%255Fro%252FDocuments%252FAnaliza%2520si%2520Sinteza%2520Dispozitivelor%2520Numerice 7. Erica Mang, Ovidiu Novac, Mihaela Novac - Analiza şi sinteza dispozitivelor numerice. Circuite combinaţionale. Îndrumător de laborator- Editura Universităţii din Oradea, 83 pag., (versiune electronică - actualizată în 01.10.2022), https://uoradea-my.sharepoint.com/personal/ovidiu_novac_didactic_uoradea_ro/_layouts/15/start.aspx#/Documents/Forms/All.aspx#InplviewHash91928fea-9b64-429c-9b47-11ef26725031=RootFolder%3D%252Fpersonal%252Fovidiu%255Fnovac%255Fdidactic%255Fuoradea%255Fro%252FDocuments%252FAnaliza%2520si%2520Sinteza%2520Dispozitivelor%2520Numerice 8. Ovidiu Novac – Proiectare Logica I, 2022, Curs, Laborator si Seminar, platforma Moodle – materiale didactice https://e.uoradea.ro/course/view.php?id=54749 9. Ovidiu Novac – Proiectare Logica I, 2022, Curs, Laborator si Seminar, platforma Teams – materiale didactice https://teams.microsoft.com/_#/school/FileBrowserTabApp/General?threadId=19:BwVzEyFT5ydECzg07uHPlZVvX9saAYHy6TbMO7B2i7M1@thread.tacv2&ctx=channel

8.3 Seminar	Teaching methods	No. of hours/ Observations

9. Coroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

The content of the subject is in accordance with the one in other national or international universities. In order to provide a better accomodation to the labour market requirements, there have been organized meetings both with representatives of the socio-economic environment and with academic staff with similar professional interest fields.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	The evaluation can be done face to face or online. Written or online exam.	Continuous Assessment, computer applications / Online assessment (Online questionnaire)	80 %
10.5 Seminar			
10.6 Laboratory	Laboratory project	Questions	Condition + 20%
10.7 Project			
10.8 Minimum performance standard: Knowledge of the basics of the topics covered and of the interconnections in a percentage of at least 50% for grade 5. Knowledge of basic notions, meanings, analytical relationships and implementation of a logical circuit, 100%, for grade 10 (maximum grade). Ability to respect deadlines.			

Completion date:
04.09.2023

Date of endorsement in the department:
27.09.2023

Date of endorsement in the Faculty Board:
29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Computers and Information Technology**
1.4 Field of study	**Computers and Information Technology**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**COMPUTERS** / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject		**LOGIC DESIGN II**					
2.2 Holder of the subject		**As. Prof. PhD eng. Ovidiu-Constantin NOVAC**					
2.3 Holder of the academic seminar/laboratory/project		**As. Prof. PhD eng. Ovidiu-Constantin NOVAC**					
2.4 Year of study	**I**	2.5 Semester	**2**	2.6 Type of the evaluation	**Exam**	2.7 Subject regime	**DD –** Domain Discipline

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**3**	of which: 3.2 course	**2**	3.3 academic seminar/laboratory	0/**1**/0
3.4 Total of hours from the curriculum	**42**	Of which: 3.5 course	**28**	3.6 academic seminar/laboratory	0/**14**/0

Distribution of time	58 hours
Study using the manual, course support, bibliography and handwritten notes	20
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	12
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	20
Tutorials	
Examinations	6
Other activities.	

3.7 Total of hours for individual study	**58**
3.9 Total of hours per semester	**100**
3.10 Number of credits	**4**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	-
4.2 related to skills	-

5. Conditions (where applicable)

5.1. for the development of the course	The course can be held face-to-face or online. The course takes place with the modern techniques available: laptop, video projector, whiteboard or on specialized platforms for online courses (Moodle: e.uoradea.ro, Microsoft Teams).
5.2. for the development of the academic seminary/laboratory/project	The laboratory can be held face-to-face or online. The laboratory works are performed using the modern means of work existing in the laboratory: Personal computers, software programs, web browsers. Students presence to all laboratory hours is compulsory. Only one laboratory work can be recovered during the semester.
6. Specific skills acquired	

Professional skills	C2. Advanced hardware and software design of computing systems. ▪ Working with mathematical, engineering and informatics fundamentals. ▪ Design of hardware components ▪ Solving problems using the tools of computer science and engineering ▪ Improving the performance of hardware systems
Transversal skills	CT1. Honorable, responsible, ethical behavior in the spirit of the law to ensure the reputation of the profession

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	• Mastering the design methods of sequential circuits and mastering the use of programmable logic circuits used in modern design. • Initiation in the analysis and synthesis of sequential circuits. • Acquiring the practical skills necessary for the logical design of some sequential circuits that are the basis of the complex architectures of computing systems; • Acquiring the necessary knowledge for modeling and simulating numerical systems using high-level hardware description languages; • Mastering the basic elements of the VHDL language, as a representative hardware description language; • Acquiring structured design techniques of computing systems using the VHDL language; • Implementation of complex applications using programmable logic circuits (FPGA)
7.2 Specific objectives	▪ Using the computer for the purpose of circuit design, functional verification of the designed scheme. ▪ Acquiring the VHDL language

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
CHAPTER 7. Sequential circuits with control inputs. Representation models of sequential circuits. The matrix of connections. Matrix of transitions. The transformation of automata. Regular expressions. The non-deterministic transition graph. Recognition of regular events by non-deterministic transition graphs. Transforming the non-deterministic graph into the state diagram. Reducing the number of states of sequential circuits. Coding of states. The assignment method through the state partition.	Interactive lecture + video projector / Online	8
CHAPTER 8. Synthesis of asynchronous sequential circuits. Reducing the number of states. Coding of states. Circuit analysis from the point of view of critical runs. The static hazard. Dynamic hazard	Interactive lecture + video projector / Online	4
CHAPTER 9. Synthesis of synchronous sequential circuits. One-step adder. Two-clock adder. Clock pulse generator. Order register. Synthesis of a synchronous sequential scheme that executes elementary operations. Algorithms for performing arithmetic operations in fixed point systems. Referral to the D.C.R. in the complementary code. The operation of moving numbers. The operation of multiplication.	Interactive lecture + video projector / Online	6

CHAPTER 10. Hardware description languages. Introduction. VHDL language development; Characteristics of the VHDL language;	Interactive lecture + video projector / Online	2
CHAPTER 11. Basic concepts in VHDL The entity. Architecture. Packages. Settings		2
CHAPTER 12. Basic elements of the VHDL language. Constructions of the VHDL language. Objects. Data types. Predefined types. Types not supported by Foundation Express. VHDL operators.	Interactive lecture + video projector / Online	4
CHAPTER 13. VHDL language instructions. Sequential instructions. Concurrent instructions.	Interactive lecture + video projector / Online	2

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8.2 Laboratory	Teaching methods	No. of hours/ Observations

1. VHDL design language. The entity. Architecture. Packages. Settings.	Introductory lecture; free and individual discussions; implementation of proposed programs.	2
2. Constructions of the VHDL language. Objects. Data types. VHDL operators. Sequential instructions. Concurrent instructions.	Introductory lecture; free and individual discussions; implementation of proposed programs.	2
3. Basic elements of the VHDL language. Description of elementary sequential circuits in VHDL	Introductory lecture; free and individual discussions; implementation of proposed programs.	2
4. Registers	Introductory lecture; free and individual discussions; implementation of proposed programs.	2
5. The 4-bit adder	Introductory lecture; free and individual discussions; implementation of proposed programs.	2
6. Synchronous counters. Asynchronous counters.	Introductory lecture; free and individual discussions; implementation of proposed programs.	2
7. Synthesis problems	Introductory lecture; free and individual discussions; implementation of proposed programs.	2

Bibliografie

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2. Mang Gerda Erica, Tirtea Rodica, Proiectarea logica în VHDL – lucrari practice, Universitatea din Oradea, ISBN 973-8083-86-9, 2000
3. Alexandru Georgescu, Adrian G. Moise, Practica proiectarii in VHDL, Editura Matrixrom, ISBN:978-973-755-397-3, 2011
4. Frank Vahid, Digital Design with RTL Design, VHDL, and Verilog, ISBN-13: 978-0470531082 ISBN-10: 0470531088, 2010, 575 pag.
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6. Dave Van den Bout, Practical Xilinx Designer Lab Book, Prentice Hall, 1997
7. Xilinx, Lab Projects Documentation, Foundation Series Express, Documentatie Xilinx, 1998
8. Erica Mang, Ovidiu Novac, Rodica Ţirtea - Analiza şi sinteza dispozitivelor numerice. Circuite secvenţiale. Îndrumător de laborator- Editura Universităţii Oradea, 52 pag, (versiune electronică - actualizată în 01.10.2022)
https://uoradea-my.sharepoint.com/personal/ovidiu_novac_didactic_uoradea_ro/_layouts/15/start.aspx#/Documents/Forms/All.aspx#InplviewHash91928fea-9b64-429c-9b47-11ef26725031=RootFolder%3D%252Fpersonal%252Fovidiu%255Fnovac%255Fdidactic%255Fuoradea%255Fro%252FDocuments%252FAnaliza%2520si%2520Sinteza%2520Dispozitivelor%2520Numerice

9. Erica Mang, Ovidiu Novac, Mihaela Novac - Analiza şi sinteza dispozitivelor numerice. Circuite combinaţionale. Îndrumător de laborator- Editura Universităţii din Oradea, 83 pag., (versiune electronică - actualizată în 01.10.2022), https://uoradea-my.sharepoint.com/personal/ovidiu_novac_didactic_uoradea_ro/_layouts/15/start.aspx#/Documents/Forms/All.aspx#InplviewHash91928fea-9b64-429c-9b47-11ef26725031=RootFolder%3D%252Fpersonal%252Fovidiu%255Fnovac%255Fdidactic%255Fuoradea%255Fro%252FDocuments%252FAnaliza%2520si%2520Sinteza%2520Dispozitivelor%2520Numerice 10. Ovidiu Novac – Proiectare Logica I, 2022, Curs, Laborator si Seminar, platforma Moodle – materiale didactice https://e.uoradea.ro/course/view.php?id=54749 11. Ovidiu Novac – Proiectare Logica I, 2022, Curs, Laborator si Seminar, platforma Teams – materiale didactice https://teams.microsoft.com/_#/school/FileBrowserTabApp/General?threadId=19:BwVzEyFT5ydECzg07uHPlZVvX9saAYHy6TbMO7B2i7M1@thread.tacv2&ctx=channel

8.3 Seminar	Teaching methods	No. of hours/ Observations

9. Coroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

The content of the subject is in accordance with the one in other national or international universities. In order to provide a better accomodation to the labour market requirements, there have been organized meetings both with representatives of the socio-economic environment and with academic staff with similar professional interest fields.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	The evaluation can be done face to face or online. Written or online exam.	Continuous Assessment, computer applications / Online assessment (Online questionnaire)	80 %
10.5 Seminar			
10.6 Laboratory	Laboratory project	Questions	Condition + 20%
10.7 Project			
10.8 Minimum performance standard: Knowledge of the basics of the topics covered and of the interconnections in a percentage of at least 50% for grade 5. Knowledge of basic notions, meanings, analytical relationships and implementation of elementar circuits, 100%, for grade 10 (maximum grade). Ability to respect deadlines.			

Completion date:
04.09.2023

Date of endorsement in the department:
27.09.2023

Date of endorsement in the Faculty Board:
29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Computers and Information Technology**
1.4 Field of study	**Computers and Information Technology**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Computers / Information Technology / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject				**Theory of Probability and Mathematical Statistics**			
2.2 Holder of the subject				**Ș.l.dr.inf. Bolojan Octavia-Maria**			
2.3 Holder of the academic seminar/laboratory/project				**Ș.l.dr.inf. Bolojan Octavia-Maria**			
2.4 Year of study	I	2.5 Semester	II	2.6 Type of the evaluation	Ex	2.7 Subject regime	FD

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	2	of which: 3.2 course	1	3.3 academic seminar/laboratory/project	1/-/-
3.4 Total of hours from the curriculum	28	Of which: 3.5 course	14	3.6 academic seminar/laboratory/project	14/-/-
Distribution of time					28 hours
Study using the manual, course support, bibliography and handwritten notes					14
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					4
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					6
Tutorials					
Examinations					4
Other activities.					

3.7 Total of hours for individual study	**28**
3.9 Total of hours per semester	**56**
3.10 Number of credits	**2**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	Students must have fundamental knowledge acquired from the following disciplines: Linear algebra, Mathematical analysis, Differential equations
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	Classroom equipped with video projector and computer, blackboard/whiteboard, flipcharts, chalk, markers, course notes, recommended bibliography. The explanations are accompanied by reasoning based on mathematical support and applied numerical examples; they are carried out in real time, in close interaction with the students in the

	classroom. It ensures course support in electronic format and access to existing bibliographic references in the university library. It is considered both the presentation of theoretical notions, but also the solving / understanding of some applied examples. The course can be held face-to-face or online.
5.2.for the development of the academic seminary	Classroom equipped with video projector and computer, blackboard/whiteboard, flipcharts, chalk, markers, course notes, recommended bibliography. The seminary can be held face-to-face or online.

6. Specific skills acquired	
Professional skills	• **C1.** Using knowledges from mathematics, physics, measurement technology, technical graphics, mechanical, chemical, electricial and electronical engineering in systems engineering/ computer engineering.
Transversal skills	• **CT1:** Responsible execution of professional tasks, respecting the values and ethics of the engineering profession, in conditions of limited autonomy and qualified assistance, based on documentation, convergent and divergent logical reasoning, practical applicability, evaluation, self-evaluation and optimal decision: responsible executor for professional tasks; • **CT2:** Identifying, describing and carrying out the processes in project management, taking over the different roles in the team and clearly and concisely describing, verbally and in writing, the results in the field of activity; • **CT3:** Objective self-assessment of the need for professional development and openness to lifelong learning, as well as the efficient use of language skills, knowledge of information technology and communication for personal and professional development: aware of the need for lifelong learning.

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ Learning and understanding of different methods, procedures, probabilistic and statistical methodologies used in information technology issues.
7.2 Specific objectives	▪ Using the terminology and basic concepts of Probability Theory, as well as those of Mathematical Statistics, the discipline aims to acquire the skills of mathematical testing (statistics) of the values of the operating parameters of various electronic equipment in the field of information technology.

8. Contents*

8.1 Course	**Teaching methods**	**No. of hours/ Observations**
I. Probability Theory 1.1. Probability field (Experimets. Field of events. Operations with events. Probability: classical and axiomatic definition. Independent events. Dependent events. Conditional probability. Total probability formula, Bayes' formula)	Lecture, Explanation, Exemplification, Solving exercices, Interactive course, Scientific Workplace .pdf slides presentation	2
1.2. Probabilistic schemes (Binomial, Multinomial, Poisson, Hypergeometric, Geometric and Pascal schemes)		2

1.3. Random variables (Distribution functions. Probability density function. Numerical characteristics of distribution functions. Operations with random variables)	with the help of the video projector; free discussions.	2
1.4. Numerical characteristics of random variables (Mean, Dispersion, Initial and Central Moments, Variance, Covariance and Correlation, Cebâșev's inequality)		4
1.5. Random vectors. Distribution function. Probability density function. Covariance. Correlation coefficient. Regression.		2
1.6. Characteristic function. Definition. Properties.		2
1.7. Classical probabilistic repartitions (Binomial, Poisson, Hypergeometric, Pascal and uniform, normal, Gamma, Beta, Exponential, HI-squared, Student, Cauchy, Fisher)		2
II. Mathematical Statistics 2.1. Selection (Sample) Theory notions. Repartion of sample data. Sample mean. Sample dispersion.		4
2.2. Estimation Theory notions. Types of estimations. Confidence Intervals method. Tests of Significance. The method of moments estimator. The method of maximum likelihood estimator.		4
2.3. Statistical hypothesis tests. Rejection region. Type I and II errors. Hypothesis and significance testing concerning means: The Z-test and T (Student)-test for the mean. The Chi-squared-test for variance. The F-test for the ratio of variances.		4

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2. Blezu, D., *Statistică* - Ed. „Alma Mater" Sibiu, 2003;
3. Blaga P., *Teoria probabilităţilor şi statistică matematică* - Ed. Presa Clujană 2002;
4. Blaga P., *Statistica matematica prin Matlab*, - Ed.Polirom 2004;
5. Clocotici, V., Stan, A., *Statistica aplicata in psihologie*, Polirom, 2000;
6. Jaba E. ,Grama A., *Analiză stratistică prin SPSS*, - Ed.Polirom 2004;
7. Mihoc Gh., Micu N., *Teoria probabilităţilor şi statistică matematică*, - Ed. Did. şi Ped., Bucureşti, 1980.
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9. Todoran. I. *Raspunsuri posibile- corelatie si prognoza*, Ed. Dacia, Cluj-Napoca, 1989;
10. Vichi, M., O.Opritz, *Classification and Data Analysis, Theory and Application, Studies in Classification, Data Analysis, and Knowledge Organization*, Springer-Verlag Berlin - Heidelberg 1999.

8.2 Academic seminar	Teaching methods	No. of hours/ Observations
1. Probability field. Total probability formula. Bayes' formula. Probabilistic schemes	Lecture/Oral presentation, Explanations, Exemplifications, Interactive seminary, Free discussions, Solving and explaining different types of exercises and problems / methods/ applied problems.	2
2. Distribution function. Properties. Probability density function.		1
3. Numerical characteristics of distribution functions. Operations with random variables		1
4. Two-dimensional random variables. Covariance and correlation. Regression.		1
5. Characteristic function.		1
6. Probabilistic repartitions		1
7. Selection (Sample) Theory notions.		1

8. Estimation Theory notions. Types of estimations. Methods for determining estimates.		2
9. The Z-test and T (Student)-test for the mean.		2
10. Hi square tests, F tests on dispersion.		2

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1. O. Agratini, P. Blaga, Gh. Coman, *Lectures on Wavelets, Numerical Methods and Statistics*, Ed. Casa Cărții de Știință, Cluj-Napoca, 2005.
2. M. Balaj, *Calculul probabilităților*, Ed. Universității din Oradea, 2007;
3. D. Blezu, *Statistică* - Ed. „Alma Mater“ Sibiu, 2003;
4. P. Blaga, Gheorghe Coman, *Statistică matematică (Ediția I)*, Universitatea "Babeș-Bolyai", Cluj–Napoca, Centrul de formare continuă și învățământ la distanță, 2000;
5. P. Blaga, Gheorghe Coman, *Statistică matematică (Ediția II)*, Universitatea "Babeș-Bolyai", Cluj–Napoca, Centrul de formare continuă și învățământ la distanță, 2000;
6. P. Blaga, *Teoria probabilităţilor şi statistică matematică* - Ed. Presa Clujană 2002;
7. P. Blaga, Gh. Coman, *Calcul numeric și Statistică matematică*, Universitatea "Babe ș-Bolyai", Cluj–Napoca, Centrul de formare continuă și învățământ la distanță, 2003;
8. P. Blaga, *Statistica matematica prin Matlab*, - Ed.Polirom 2004;
9. E. Jaba, A. Grama, *Analiză stratistică prin SPSS*, - Ed.Polirom 2004;
10. Gh. Mihoc, N. Micu, *Teoria probabilităţilor şi statistică matematică*, - Ed. Did. şi Ped., Bucureşti, 1980.

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline is in accordance with what is made in other university centers that have accredited this specialization. The experience gained in the relations with employers from Bihor in the students' internship activities was taken into account.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	- the correctness and completeness of the assimilated notions; - an overall understanding of the importance of the discipline studied and the connection with the other fundamental disciplines; - logical coherence; - the degree of assimilation of the specialized language; - criteria regarding the attitudinal aspects: conscientiousness, interest in individual study. Minimum required conditions for passing the exam (mark 5): each subject is solved/treated in accordance with the minimum performance standard For 10: Correct and complete answers to all subjects/questions/problems/ topics/requirements.	Written paper/exam Students receive for solving topics/subjects/problems that cover the theoretical and applied part of the discipline. The evaluation can be done face to face or online.	70%
10.5 Academic seminar	- ability to operate with abstract knowledge; - ability to apply in practice; - criteria regarding the attitudinal aspects: conscientiousness, interest in individual study. Minimum required conditions for passing the	Grades awarded for the participation quality in the activities that are held during the seminars, Tests, Worksheets, Projects.	30%

	examination (grade 5): each subject is solved/treated in accordance with the minimum performance standards. For 10: Correct and complete answers to all subjects/questions/problems/ topics/requirements.		
10.6 Laboratory			
10.7 Project			

10.8 Minimum performance standard:

- Defining notions, stating theoretical results
- Identifying and selecting methods to approach simple concrete problems
- Elaboration of algorithms to solve a problem with a low degree of difficulty
- Realization and completing demonstrations for studied mathematical results, with medium degree of difficulty
- Mathematical modeling of a problem with a low degree of difficulty

Course / Academic seminar:

Minimum requirements for grade 5:

- Attendance at least 80% of the total number of course and seminar hours
- Solving the individual topics within the seminar (50%)
- Solving 50% of the exam applications

Requirements for grade 10:

- Attendance to at least 80% of the total number of course and seminar hours
- Integral solving of the individual topics within the seminar
- Active participation in all activities organized during the course and seminar

Completion date:
27.09.2023

Course/Seminary holder:
Ș.l. dr. inf. Bolojan Octavia-Maria
obolojan@uoradea.ro

Date of endorsement in the department:
27.09.2023

Head of the Department:
Conf.univ.dr.ing.Mirela PATER
mpater@uoradea.ro

Date of endorsement in the Faculty Board:
29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Computers and Information Technology**
1.4 Field of study	**Computers and Information Technology**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Computers / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject	**Digital Electronics II**						
2.2 Holder of the subject	**Lect.PhD. Mircea-Petru URSU**						
2.3 Holder of the academic seminar/laboratory/project	**Lect.PhD. Mircea-Petru URSU**						
2.4 Year of study	**II**	2.5 Semester	**4**	2.6 Type of the evaluation	**Ex.**	2.7 Subject regime	**FD**

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**4**	of which: 3.2 course	**2**	3.3 academic seminar/laboratory/project	**1/1**
3.4 Total of hours from the curriculum	**56**	Of which: 3.5 course	**28**	3.6 academic seminar/laboratory/project	**14/14**

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	20
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	8
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	10
Tutorials	2
Examinations	4
Other activities.	

3.7 Total of hours for individual study	**44**
3.9 Total of hours per semester	**100**
3.10 Number of credits	**4**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions)
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	✓ presence minimum 50% at the courses ✓ the courses can be held face-to-face or online
5.2.for the development of the academic seminary/laboratory/project	✓ compulsory presence at all laboratories ✓ the students must read, understand and observe the laboratory tasks

	✓ over the semester, maximum 2 laboratory tasks can be recovered (30% of 5 tasks) ✓ the final laboratory grade under 5(five) implies discipline restoring ✓ the laboratory / project can be held face-to-face or online

6. Specific skills acquired	
Professional skills	**CP3.** Solving problems using the instruments of computer science and engineering. **CP5.** Design, life cycle management, integration and integrity of hardware, software and communication systems.
Transversal skills	CT1. Application of the intellectual property rights (including technological transfer), of product certifying methodology, of principles, regulations and values of the professional ethics code within the own rigorous, efficient and responsible work strategy, observing the legislation. CT2. Identification of roles and responsibilities in a multi-specialized team, taking decisions and assignment of tasks, applying relating and efficient work techniques within the team.

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ familiarization of the students from the specialization with the problems related to the use of digital integrated circuits, of their functions, characteristics and parameters according to the integrated families to which they belong.
7.2 Specific objectives	▪ this course presents the basic characteristics of digital circuits, both made with discrete components and made with integration technologies; ▪ the bipolar technologies are presented, ordered by their historical appearance; ▪ this course aims the acquiring of knowledge on how to operate and use the components of digital circuit families; ▪ laboratory: tracking the behavior and values of signals at different measurement points, at the level of digital electronic circuits designed and implemented on programmable logic circuits of FPGA type.

8. Contents*

8.1 Course	Teaching methods	No. of hours / Observations
Chapter 1. Designing methods for digital circuits; sequential circuits	• free speech, with video projector and board in an interactive manner, with questions for students to increase implication	28
Chapter 2. Multivibrator circuits. Bistable circuits: SR, JK, D, T, synchronous, asynchronous. Monostable circuits. Astable circuits: RC, quartz. CMOS integrated multivibrators.		
Chapter 3. Combinational circuits. Boolean algebra. Logical gates. Adders. Comparators. Bit masking. Circuits for incrementing, decrementing and two's complement. Coders and decoders. Multiplexers and demultiplexers. Selection gates. Parity detector. ROM memory.		
Chapter 4. Families of logical circuits. NMOS logical circuits. CMOS logical circuits. I2L logical circuits. ECL logical circuits. Interfacing between different families of logical circuits: TTL-to-CMOS interfaces, CMOS-to-TTL interfaces.		

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1. Ursu M.P., Popescu D.E., Electronică digitală 2, Editura Universității din Oradea, 2021, ISBN 978-606-10-2147-5
2. PowerPoint slides made available to students in electronic format on the Office 365 platform.
3. Popescu Daniela E., Popescu Corneliu – Circuite elementare de calcul, Matrix Rom București, ISBN 973-685-123-0
4. Popescu C., D.Filipas, H.Dragan, Proiectare cu Altera a circuitelor digitale, Editura Universității din Oradea, ISBN 973-613-707-4, 2004

<table>
<tr><td colspan="3">5. Stratulat M., D.E.Popescu, Poszet Otto, Circuite digitale, Editura Universității din Oradea, ISBN 973-613-707-4, 2004
6. Ardelean I s.a, Circuite integrate CMOS, manual de utilizare, IPTV Timisoara, 1989
7. Materials on Office 365 regarding course slides and files for the laboratory tasks.
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9. Jan M. Rabaey, Digital Integrated Circuits A Design Perspective, A Prentice-Hall Publication, http://bwrc.eecs.berkeley.edu/Classes/IcBook/</td></tr>
<tr><td>8.2 Academic laboratory</td><td>Teaching methods</td><td>No. of hours/ Observations</td></tr>
<tr><td>1. Presentation of the laboratory, regulations of work protection, conventional signs specific to the field of computing systems, general notions regarding the computer architecture and digital electronics</td><td rowspan="7">The students receive the tasks at least a week earlier, to study and take notes. After a brief theoretical test at the beginning of laboratory, the students perform the tasks guided by the teacher.
Operation: ALTERA, CircuitVerse</td><td rowspan="7">Two hours are assigned for each of these 7 detailed laboratory tasks</td></tr>
<tr><td>2. The Gray-binary-decimal-hexadecimal decoder.</td></tr>
<tr><td>3. The adder.</td></tr>
<tr><td>4. D-type flip-flops.</td></tr>
<tr><td>5. Memory and shifting registers.</td></tr>
<tr><td>6. The counter.</td></tr>
<tr><td>7. Laboratory tasks recovery, closing of the scholar situations.</td></tr>
<tr><td colspan="3">Bibliography
1. Ursu M.P., Popescu D.E., Electronică digitală 2, Editura Universității din Oradea, 2021, ISBN 978-606-10-2147-5
2. PowerPoint slides made available to students in electronic format on the Office 365 platform.
3. M. Morris Mano, Michael D. Ciletti, Digital Design, Prentice Hall, ISBN-10: 0132774208 • ISBN-13: 9780132774208, 2013
4. Stratulat M, D.E.Popescu, Poszet Otto, Circuite digitale, Editura Universității din Oradea, ISBN 973-613-707-4, 2004
5. PDF files of the laboratory tasks loaded on platform Office 365.
6. https://circuitverse.org/</td></tr>
<tr><td>8.3 Academic project</td><td>Teaching methods</td><td>No. of hours/ Observations</td></tr>
<tr><td>1. Presentation of the design specifications.</td><td rowspan="7">The students receive the tasks in due time, to study and take notes. After a brief theoretical test at the beginning of laboratory, the students perform the project tasks guided by the teacher.
Operation: ALTERA, CircuitVerse</td><td rowspan="7">Two hours are assigned for each of the 7 detailed project tasks.</td></tr>
<tr><td>2. Design of the asynchronous digital automated device using gates.</td></tr>
<tr><td>3. Design of the synchronous digital automated device using gates and bistable multivibrators.</td></tr>
<tr><td>4. Design of the synchronous digital automated device using bistable multivibrators and decoders.</td></tr>
<tr><td>5. Design of the synchronous digital automated device using counters, multiplexers and decoders.</td></tr>
<tr><td>5. Design of the synchronous digital automated device using counters, multiplexers and PROM memories.</td></tr>
<tr><td>7. Project handing over.</td></tr>
<tr><td colspan="3">Bibliography
1. Ursu M.P., Popescu D.E., Electronică digitală 2, Editura Universității din Oradea, 2021, ISBN 978-606-10-2147-5
2. PowerPoint slides made available to students in electronic format on the Office 365 platform.
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4. PDF files of the project tasks loaded on platform Office 365.
5. https://circuitverse.org/</td></tr>
</table>

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline is found in the curricula of Computer and Information Technology specializations and other university centers that have accredited these specializations (Technical University of Cluj-Napoca, University of Craiova, "Politehnica" University of Timisoara, Gh. Asachi University of Iasi, etc.), and knowledge of the architecture and organization of computer systems as well as their operation and design is a stringent requirement of employers in the field (RCS & RDS, Plexus, Neologic, Celestica, Keysys, etc.).

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard ✓ For 10: detailed knowledge of all topics	**Oral exam** Students receive and solve topics related to the course. The exam can be taken face-to-face or online.	60%
10.6 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard ✓ For 10: detailed knowledge of the practical implementation of all operators of the studied families	**Practical application** At each laboratory, students receive a grade depending on the quality of the activity performed. Based on these grades, converted into scores, a laboratory mark results.	40%
10.7 Project	The students must adequately solve the project theme, with detailed presentations about the theoretical aspects, the practical aspects and the design of the digital electronic automated device.	**Project evaluation** The project is admitted or rejected according to its quality.	

10.8 Minimum performance standard:

Assimilation of detailed knowledge about the construction, operation and design of the basic gates of families through the course material.

The studied design methods are exemplified on existing architectures, including the study of special architectures. A VHDL processor will be designed for the FPGA.

The timely solution, in individual activities and group activities, in conditions of qualified assistance, of the problems that require the application of principles and rules respecting the norms of professional deontology.

Responsibility for specific tasks in multi-specialized teams and effective communication at the institutional level.

Development of team spirit, spirit of mutual help, awareness of the importance of training during the semester for good and sustainable results, awareness of the importance of research, own research related to learning (library, internet), cultivating a work discipline, done correctly and on time.

Course: knowledge of the basic notions of the exam topics, without details about their operation.

Laboratory: basic knowledge of logic circuit families, with their own characteristics, respectively specific parameters without presenting details on their implementation.

Project: basic knowledge of the theoretical and practical aspects of the theme, and the design of the digital automated device.

Completion date: 01.09.2023	lect.PhD. Mircea-Petru URSU mpursu@uoradea.ro
Date of endorsement in the department: 27.09.2023	Department Director assoc.prof.eng.PhD. Mirela Pater mpater@uoradea.ro
Date of endorsement in the Faculty Board:	Dean: prof.PhD.habil. Francisc Ioan HATHAZI francisc.hathazi@gmail.com

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Computers and Information Technology**
1.4 Field of study	**Computers and Information Technology**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Computers / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject		**Computer Graphics Elements**					
2.2 Holder of the subject		**Pater Alexandrina Mirela**					
2.3 Holder of the academic seminar/laboratory/project		**Pater Alexandrina Mirela**					
2.4 Year of study	II	2.5 Semester	3	2.6 Type of the evaluation	Ex	2.7 Subject regime	FD - Field Discipline

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	0/1/1
3.4 Total of hours from the curriculum	56	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	0/14/14
Distribution of time					hours
Study using the manual, course support, bibliography and handwritten notes					18
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					10
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					10
Tutorials					2
Examinations					4
Other activities.					
3.7 Total of hours for individual study	**44**				
3.9 Total of hours per semester	**100**				
3.10 Number of credits	4				

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions)
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	Classroom equipped with video projector and computer. The course can be held face to face or online.
5.2.for the development of the academic seminary/laboratory/project	Laboratory equipped with computers that are connected to the Internet and dedicated software installed. The laboratory / project can be held face to face or online

6. Specific skills acquired	
Professional skills	CP1. Operating with scientific, engineering and informational fundaments CP3. Solving problems using computer science and engineering instruments
Transversal skills	CT2. Identifying, describing and carrying out the processes in project management, taking over the different roles in the team and clearly and concisely describing, verbally and in writing, the results in the field of activity.

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	The course aims to guide students if they want to make a graphics program, to know how to put the problem correctly and to know the functions and techniques specific to this field. The presentation of general concepts and notions is followed by the presentation of transformations that can be applied to 2D and 3D objects. The basic spatial and plane geometric transformations are presented. The most commonly used projections are also presented to make it possible to view the 3D model in a 2D window. The framing of the image in the observation volume (3D-Clipping) and the framing in the viewing window (2D Clipping) are not ignored.
7.2 Specific objectives	**Theoretical knowledge:** • Adequate use in professional communication of the concepts of computability, complexity, programming paradigms and modeling of computing and communications systems • Using interdisciplinary knowledge, solutions and tools, conducting experiments and interpreting their results • To know the fundamental concepts of computer graphics • To know the graphical facilities offered by the C ++ programming language • To understand and know the specific functions and techniques of this field, the fundamental spatial (3D) and plane (2D) geometric transformations, the methods of making projections, to make it possible to visualize the 3D model, in a 2D window, the main methods of image synthesis **Skills acquired:** • Development and implementation of IT solutions for concrete problems • Master and use the graphical features offered by the C ++ and Processing programming language • To use in the creation of computer graphic applications the mathematical support implemented in the functions and techniques specific to the field • Solve various problems using 3D and 2D fundamental geometric transformations • Solve different applications using projection methods to make it possible to view the 3D model in a 2D window • Solve different applications using the main methods of image synthesis • Evaluate and justify the effectiveness of methods chosen for implementation and adopt optimal solutions from different points of view

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Introductory notions	Powerpoint presentation with the help of the video projector; free discussions;	1 hours
2. Graphic equipment	Powerpoint presentation with the help of the video projector; free discussions;	2 hours

3. Graphic geometric primitives	Powerpoint presentation with the help of the video projector; free discussions;	1 hours
4. Coordinate systems	Powerpoint presentation with the help of the video projector; free discussions;	1 hours
5. Geometric transformations	Powerpoint presentation with the help of the video projector; free discussions;	1 hours
6. Fundamental transformations	Powerpoint presentation with the help of the video projector; free discussions;	6 hours
7. Projections 7.1 Parallel projections 7.2 Perspective projections	Powerpoint presentation with the help of the video projector; free discussions;	5 hours
8. Clipping transformations 8.1 Clipping for points 8.2 Clipping for lines 8.3 Clipping for polygons	Powerpoint presentation with the help of the video projector; free discussions;	6 hours
9. Visualization transformations 9.1 2D visual transformations 9.2 3D visualization transformations 9.3 The 3D visualization system	Powerpoint presentation with the help of the video projector; free discussions;	4 hours
10. Methods of image synthesis	Powerpoint presentation with the help of the video projector; free discussions;	1 hours

Bibliografy

1. Vasile Baltac şi colectivul, *Calculatoarele electronice, grafica interactivă şi prelucrarea imaginilor*, Editura Tehnică, Bucureşti, 1985
2. Dorian Dogaru, *Elemente de grafică 3D,* Editura ştiinţifică şi enciclopedică, Bucureşti, 1988
3. Dana Petcu, Lucian Cucu, *Principii ale graficii pe calculator,* Editura Excelsior, Timişoara, 1995
4. James D. Foley, Andries van Dam, Steven K. Feiner, John F. Hughes, *Computer Graphics: Principles and Practice in C* (2nd Edition), 1995
5. Hughes, Van Dam, Mcguire, Sklar, Foley, Feiner, Akeley Aw, *Computer Graphics: Principles and Practise* , 2009
6. Steve Marschner e Peter Shirley, *Fundamentals of Computer Graphics, Fourth Edition* , 4ª ed., AK Peters/CRC Press, 15 dicembre 2015, ISBN 9781482229394
7. www.processing.org
8. Alan Watt, *3D Computer Graphics* (3rd edition), Addison-Wesley, 2000.
9. Mirela Pater, *Elemente de grafică pe calculator,* Editura Universităţii din Oradea, Oradea, 2002
10. Mirela Pater, *Principii ale graficii pe calculator,* Editura Universităţii din Oradea, Oradea, 2008
11. Mirela Pater, *Elemente de grafică pe calculator* - slides, format electronic, 2013

https://uoradea-my.sharepoint.com/personal/alexandrina_pater_didactic_uoradea_ro/_layouts/15/start.aspx#/default.aspx?RootFolder=%2Fpersonal%2Falexandrina_pater_didactic_uoradea_ro%2FDocuments%2FEGC&FolderCTID=0x0120007BA764452C16D943BCAFC2070C435E5C&View={FD3D038C-0867-44C7-B0FC-F01A185020B1}

8.2 Academic laboratory	Teaching methods	No. of hours/ Observations

Labor protection training Presentation of the Processing language	Powerpoint presentation with the help of the video projector; Applications - programs; Assistance in using software development;	2 hours
Graphic modes. Coordinate transformations. Graphic primitives - Graphic procedures and functions of the processing language	Powerpoint presentation with the help of the video projector; Applications - programs; Assistance in using software development;	2 hours
Image, painting and text processing in processing	Powerpoint presentation with the help of the video projector; Applications - programs; Assistance in using software development;	2 hours
Fundamental Transformations - Implementation 2D Scaling, 2D Translation, 2D Rotation, 2D Shearing, Parallel Projections and Perspective	Powerpoint presentation with the help of the video projector; Applications - programs; Assistance in using software development;	2 hours
Animations and interactions in processing	Powerpoint presentation with the help of the video projector; Applications - programs; Assistance in using software development;	2 hours
Clipping transformations - Clipping for points, Clipping for lines, Clipping for polygons	Powerpoint presentation with the help of the video projector; Applications - programs; Assistance in using software development;	2 hours
3D graphic primitives in Processing	Powerpoint presentation with the help of the video projector; Applications - programs; Assistance in using software development;	2 hours
Final test		2 hours
8.3 Academic project	Teaching methods	No. of hours/ Observations
Fundamental Transformations - Implementing Scaling, Translation, Rotation, Shearing and 3D Projections in Processing	Applications - programs; Assistance in using software development;	14 hours

Bibliograpy

- Mirela Pater, *Principii ale graficii pe calculator*, Editura Universităţii din Oradea, Oradea, 2008
- Cristian Tiurbe, Mirela Pater, *Elemente de grafică pe calculator*, îndrumător de laborator, Editura Universităţii din Oradea, 2014 https://uoradea-my.sharepoint.com/personal/cristian_tiurbe_didactic_uoradea_ro/_layouts/15/start.aspx#/Documents/EGC%20-%20Lab
- Alan Watt, *3D Computer Graphics* (3rd edition), Addison-Wesley, 2000.
- Hughes, Van Dam, Mcguire, Sklar, Foley, Feiner, Akeley Aw, *Computer Graphics: Principles and Practise* , 2009
- Steve Marschner e Peter Shirley, *Fundamentals of Computer Graphics, Fourth Edition* , 4ª ed., AK Peters/CRC Press, 15 dicembre 2015, ISBN 9781482229394
- www.processing.org
- James D. Foley, Andries van Dam, Steven K. Feiner, John F. Hughes, *Computer Graphics: Principles and Practice in C* (2nd Edition), 1995

- www.processing.org
- https://www.youtube.com/watch?v=2VLaIr5Ckbs&list=PLzJbM9-DyOZyMZzVda3HaWviHqfPiYN7e

https://www.youtube.com/user/shiffman

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

The content of the discipline is found in the curriculum of Computer and Information Technology specialization from other university centers that have accredited these specializations (Technical University of Cluj-Napoca, University of Craiova, "Politehnica" University of Timisoara, Gh. Asachi University of Iasi, etc.), and knowing the basic principles of operating a computer system, knowing its main components and implementing the components of hardware, software and communication systems, carrying out projects in areas of knowledge are stringent requirements of employers in the field (Qubiz, DecIT, Accesa, Fortech, Diosoft, Five Tailors, etc.)

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard For 10: Knowledge Understanding	Written paper The evaluation can be done face to face or online	34%
10.5 Academic seminar	-		
10.6 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard For 10:Knowledge and understanding;Ability to explain and interpret;Complete and correct solution of the requirements.	- Laboratory / practical works -Tests during the semester The evaluation can be done face to face or online	33%
10.7 Project	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard For 10:Knowledge and understanding;Ability to explain and interpret;Complete and correct solution of the requirements.	The evaluation can be done face to face or online	33%
10.8 Minimum performance standard: Selection and independent use of learned methods and algorithms for known standard situations as well as completion of calculations. Development and implementation of algorithms using learned principles.			

The timely solution, in individual activities and activities carried out in groups, in conditions of qualified assistance, of the problems that require the application of principles and rules respecting the norms of professional deontology. Modeling a typical engineering problem using the formal apparatus characteristic of the field.

Completion date: 15.09.2023

Cours instructor Conf.dr.ing. Mirela Pater

Date of endorsement in the department: 27.09.2023

Dean: Prof.dr.ing.habil. Francisc Hathazi

Date of endorsement in the Faculty Board: 29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	Department of Computers and Information Technology
1.4 Field of study	Computers and information technology
1.5 Study cycle	Bachelor
1.6 Study program/Qualification	Computers/ Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject			**Data bases**				
2.2 Holder of the subject			Prof. dr. ing. Győrödi Cornelia Aurora				
2.3 Holder of the academic seminar/laboratory/project			Sef. Lucr. Dr. Ing. Pecherle George Dominic				
2.4 Year of study	II	2.5 Semester	2	2.6 Type of the evaluation	Ex	2.7 Subject regime	DD

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	0/2/0
3.4 Total of hours from the curriculum	56	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	0/28/0

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	18
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	10
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	10
Tutorials	4
Examinations	2
Other activities.	

3.7 Total of hours for individual study	**44**
3.9 Total of hours per semester	**100**
3.10 Number of credits	4

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions)
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	Classroom equipped with video projector and computer - The course can be held face to face or online
5.2.for the development of the academic seminary/laboratory/project	Laboratory equipped with video projector and computers that are connected to the internet, and they have installed Oracle 12c software. The laboratory can take place face to face or online
6. Specific skills acquired	

Professional skills	C2. Designing hardware, software and communication components C3. Solving problems using computer science and engineering instruments
Transversal skills	

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ Learning the fundamental notions regarding the concepts of relational database theory and SQL relational language. Acquiring the skills needed to design and implement relational database management applications.
7.2 Specific objectives	▪ Learning the fundamental theory concepts of database. The steps of database design. The entity-relationship model of databases. The relational model of databases. The defining of the integrity constraints of the relational databases. The SQL relational language.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
CHAPTER.1. The elements of database theory	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
CHAPTER.2. The Entity-relationship model		4 hours
CHAPTER.3. Normalization theory of relational databases		4 hours
CHAPTER.4. Concepts used in the relational model		2 hours
CHAPTER.5. The Relational language. SQL language. - Data types in SQL - Defining the schema of a relational database		2 hours
CHAPTER.6. Join operations in SQL language		2 hours
CHAPTER 7. The Data manipulation language in SQL. Defining of index files and views		2 hours
CHAPTER 8. Advanced join techniques. Aggregate functions in SQL		2 hours
CHAPTER 10. Subqueries in SQL. Sets of operators in SQL		2 hours
CHAPTER 11. Cloud environments for databases. Cloud database management solutions		4 hours
CHAPTER 12. Controlling access to the relational database. - Transaction control in the relational database		2 hours

Bibliography

1. Ion Lungu, Anca Andreescu, Adela Bâra, Anda Belciu, Constanța Bodea, Iuliana Botha, Vlad Diaconița, Alexandra Florea, **Cornelia Győrödi**, " Tratat de baze de date. Sisteme de gestiune a bazelor de date ", Volumul 2, Editura ASE, 2015, ISBN 978-606-505-472-1, nr. pag 375.

2. Győrödi Cornelia**,** Lungu Ion "*Sisteme de baze de date avansate*", Editura Universității din Oradea, 2011, ISBN 978-606-10-0447-8, nr. pag 350.
3. Győrödi Cornelia, Pecherle George, "*Baze de date relaționale. Teorie și aplicații în Oracle*"**,** Editura Universitati, 2008, ISBN 978-973-759-460-0.
4. Baze de date relaţionale. Teorie şi aplicaţii - Győrödi Cornelia, Editura Treira – 2000, ISBN 973-8159-23-7.
5. David M. Kroenke , David J. Auer – Database Processing: Fundamentals, Design and Implementation, 15th Edition, Pearson, 2019, ISBN: 978-0134802749.
6. Abraham Silberschatz, Database System Concepts, 7th Ed., McGraw-Hill, 2019, ISBN 9780078022159.
7. Ileana Popescu -"Baze de date relaţionale", Editura Universităţii din Bucureşti, 1996.
8. https://www.oracle.com/ro/database/what-is-a-cloud-database/
9. Oracle Education, Oracle Corporation, 2021, http://ilearning.oracle.com/ (accesarea se face prin user și parolă care sunt create fiecărui student în parte)
10. https://oracle.com/ro/database/what-is-a-cloud-database
11. Oracle Academy iLearning (https://academy.oracle.com)
12. https://e.uoradea.ro/course/view.php?id=1929 Materials (courses and laboratories)

8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
1. Getting started with database management systems. Installing and configuring Oracle SQL Developer Data Modeler systems, Oracle 12c.	Oral presentation. Students work with the following tools: - Oracle SQL Developer Data Modeler - Oracle Application Express The students are assessed by a practical test using computer from laboratory topics.	2 hours
2. Entity-relationship diagram for a practical application.		2 hours
3. Normalization of the relational database. Normal forms FN1, FN2, FN3, FNCB of the concept model. Practical applications - case study.		2 hours
4. Transforming the conceptual model into a physical model. Practical applications - case study.		2 hours
5. Creating Standalone Database in Oracle Cloud. Oracle Cloud Infrastructure (OCI)		2 hours
6. SQL language. The SQL command for querying a table		2 hours
7. Join operations in SQL language		2 hours
8. The Data manipulation language in SQL. Defining of index files and views		2 hours
9. Advanced join techniques. Aggregate functions in SQL		2 hours
10. Subqueries in SQL. Sets of operators in SQL		2 hours
11. Controlling access to the relational database. GRANT and REVOKE commands.		2 hours
12. Transaction control in the relational database. Commit, Savepoint and Rollback commands.		2 hours
13. Oracle Cloud Compute VM - Install Apache and PHP. Design and implementation of a library management application.		2 hours
14. Final test		2 hours

Bibliography

1. Ion Lungu, Anca Andreescu, Adela Bâra, Anda Belciu, Constanța Bodea, Iuliana Botha, Vlad Diaconița, Alexandra Florea, **Cornelia Győrödi**, " Tratat de baze de date. Sisteme de gestiune a bazelor de date ", Volumul 2, Editura ASE, 2015, ISBN 978-606-505-472-1, nr. pag 375.
2. Győrödi Cornelia**,** Lungu Ion "*Sisteme de baze de date avansate*", Editura Universității din Oradea, 2011, ISBN 978-606-10-0447-8, nr. pag 350.
3. Győrödi Cornelia, Pecherle George, "*Baze de date relaționale. Teorie și aplicații în Oracle*"**,** Editura Universitati, 2008, ISBN 978-973-759-460-0.
4. Oracle SQL Developer Data Modeler (http://www.oracle.com/technetwork/developer-tools/datamodeler/overview/index.html
5. Oracle Application Express (https://iacademy.oracle.com/)
6. Oracle Academy iLearning (https://academy.oracle.com)
7. https://e.uoradea.ro/course/view.php?id=1929 Materials (courses and laboratories)

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard: 50% of the subjects from the final exam should be correctly solved - For 10: 100% of the subjects from the final exam should be correctly solved	Semester exam – written	66%
10.5 Academic seminar	Minimum required conditions for passing the examination (grade 5): in accordance with the minimum performance standard - For 10:	-	-
10.6 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard: 50% of the problems from the final laboratory test should be correctly solved - For 10: 100% of the problems from the final laboratory test should be correctly solved	Oral/written	34%
10.7 Project			
10.8 Minimum performance standard: Course: 50% of the maximum score of the final exam Academic seminar: Laboratory: 50% of the maximum score of the laboratory evaluations Project:			

Course instructor — Head of department

Completion date:
25.09.2023

prof. dr. ing. Cornelia Győrödi — conf. dr. ing. Pater Mirela
E-mail: cgyorodi@uoradea.ro

Date of endorsement in the department:
27.09.2023

Date of endorsement in the Faculty Board:
29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	*Computers and Information Technology*
1.4 Field of study	*Computers and Information Technology*
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	*Computers & Information Technology /* **Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject		*Digital Electronics 1*					
2.2 Holder of the subject		Prof.dr.habil.eng. Daniela Elena Popescu					
2.3 Holder of the academic seminar/laboratory/project		**lect.dr.ing. Mircea-Petru Ursu**					
2.4 Year of study **II**		2.5 Semester **3**		2.6 Type of the evaluation	**Ex**	2.7 Subject regime	**DD**

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**3**	of which: 3.2 course	**2**	3.3 academic seminar/laboratory/project	**1**
3.4 Total of hours from the curriculum	**42**	Of which: 3.5 course	**28**	3.6 academic seminar/laboratory/project	**14**

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	28
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	14
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	22
Tutorials	2
Examinations	4
Other activities.	

3.7 Total of hours for individual study	**70**
3.9 Total of hours per semester	**112**
3.10 Number of credits	**4**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions)
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	- The course can be held face to face or online " - attendance at least 50% of the courses
5.2.for the development of the academic seminary/laboratory/project	- The seminar / laboratory / project can be held face to face or online - Mandatory presence at all laboratories; - Students must have completed the theoretical part of the paper; - A maximum of 4 works can be recovered during the semester (30%);

	- The frequency at laboratory hours below 70% leads to the restoration of the discipline
6. Specific skills acquired	
Professional skills	CP3. Problem solving using Computer Science and engineering tools CP5. Design, life cycle management, integration and integrity of hardware, software and communications systems
Transversal skills	CT1. Applying, in the context of compliance with the law, intellectual property rights (including technology transfer), product certification methodology, principles, norms and values of the code of professional ethics within its own rigorous, efficient and responsible work strategy CT2. Identify roles and responsibilities in a multi-specialized team decision-making and assigning tasks, with the application of relationship techniques and efficient work within the team

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ The discipline aims to familiarize students in specialization with issues related to the use of digital integrated circuits, their functions, characteristics and parameters depending on the integrated families to which they belong.
7.2 Specific objectives	• The course aims to present the basic characteristics of digital circuits - both made with discrete components and made with integration technologies. • Bipolar technologies are studied in the order of their historical appearance • The course aims at acquiring knowledge on how to operate and use the components within the digital circuit families • Laboratory: Tracking the signal values in the different measuring points - at the level of discrete circuits, as well as at the level of integrated circuits

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
Chapter 1 METHODS OF PULSE CIRCUIT ANALYSIS. Methods for analyzing switching circuits. RC filter goes down. RC filter switches up Chapter 2. LOGIC CIRCUITS. Elements of logical algebra. Parameters of logic circuits with discrete components. Methods for designing logic circuits with discrete components. Elementary logic circuits with components. Diode logic circuits. Logic circuits with diodes and transistors Chap.3. PARAMETERS OF INTEGRATED LOGIC CIRCUITS. Static transfer characteristic. Protection edge against disturbances. Load factors. Switching speed. Power consumption. Chap.4. LOGIC CIRCUITS INTEGRATED WITH DIODES AND TRANSISTORS (RTL). RTL fundamental gate. RCTL series. Chapter 5 LOGIC CIRCUITS INTEGRATED WITH DIODES AND TRANSISTORS (DTL). The fundamental gate. DTL gate with control transistors. Realization of the wired	• Free course presentation with video projector / overhead projector and blackboard in an interactive way: punctuate from time to time questions for students in order to increase the degree of interactivity • Indication of topics for documentation and individual study	28 hours

logic function. HTL high threshold DTL gate. Gate YES OR NO Chapter 6 INTEGRATED LOGIC CIRCUITS TTL. TTL standard series. TTL fundamental gate parameters. Static transfer characteristic. Input feature. Output feature. Variation of temperature parameters. Noise margin. Load factor. Power dissipated. Propagation times. Rules for using TTL ports. Evolution of TTL integrated circuits. TTL integrated circuits. SI gate. Gate OR NOT. Gate OR. Gate YES OR NO. Expandable SI-OR-NOT gate. TTL gate with empty collector. Control circuits. Fast TTL series. Low power TTL series. TTL series with Schottky diodes. TTL series with low power Schottky diodes. Advanced TTL Shottky series. TTL family of integrated circuits. TTL series with three states (TSL). Interface circuits. Line transmitters and receivers. Standard series interconnection. Gates of very high power Chapter 7 LOGIC CIRCUITS WITH MOS TRANSISTORS. NMOS logic circuits. CMOS logic circuits. CMOS inverter		

Bibliography

- Course notes (slides) made available to students in electronic format on the Office 365 platform
- Popescu Daniela E., Popescu Corneliu - Elementary computing circuits, Matrix Rom Bucharest, ISBN 973-685-123-0
- Popescu C., D. Filipas, H. Dragan, Design with Altera of digital circuits, University of Oradea Publishing House, ISBN 973-613-707-4, 2004
- Stratulat M, D.E.Popescu, Poszet Otto, Digital Circuits, University of Oradea Publishing House, ISBN 973-613-707-4, 2004
- M. Morris Mano, Michael D. Ciletti, Digital Design, Prentice Hall, ISBN-10: 0132774208 • ISBN-13: 9780132774208, 2013
- Ardelean I s.a., CMOS integrated circuits, user manual, IPTV Timisoara, 1989
- The material dep on Mobweb related to the slides from the course, respectively to the laboratory works
- R.P. Jain, Modern digital electronics, 2010, Tata McGraw-Hill Education, Amazon Books
- Jan M. Rabaey, Digital Integrated Circuits A Design Perspective, A Prentice-Hall Publication, http://bwrc.eecs.berkeley.edu/Classes/IcBook/

8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
1. Presentation of the laboratory, labor protection norms and conventional signs specific to the field of computer systems - general, generalities regarding the architecture of computer systems. 2. Introduction to Quartus II 3. Logic Gates 4. Equality detector 5. Multiplexers and Counters 6. 7-segment decoder 7. Recovery of laboratories and conclusion of the situation.	Students receive laboratory papers at least one week in advance, study them, inspect them, and take a theoretical test at the beginning of the laboratory. Then, the students carry out the practical part of the work under the guidance of the teacher. Operation with ALTERA	Each 2 hours are allocated for each of the 7 detailed points of the laboratory activity

Bibliography

1. Notite de curs (slide-uri) puse la dispozitie studentilor in format electronic pe platforma Office 365,
2. Stratulat M, D.E.Popescu, Poszet Otto, Circuite digitale, Editura Universităţii din Oradea, ISBN 973-613-707-4, 2004

3. Platforma Office 365 cu lucrarile de laborator

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline is found in the curriculum of Computer and Information Technology specializations and other university centers that have accredited these specializations (Technical University of Cluj-Napoca, University of Craiova, "Politehnica" University of Timisoara, Gh. Asachi University of Iasi, etc.), and knowledge of the architecture and organization of computer systems as well as their operation and design is a stringent requirement of employers in the field (Rds & Rcs, Plexus, Neologic, Celestica, Keysys, etc.).

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5) in accordance with the minimum performance standard: - it is necessary to know the fundamental notions required in the subjects, without presenting details on them For 10: - for grade 10, a thorough knowledge of all is required	The evaluation can be done face to face or online depending on the situation imposed	70%
10.6 Laboratory	- for note 5, the broad outline knowledge of the logic circuit families, with their own characteristics, respectively the specific parameters without presenting details on their implementation Specifically: For grade 5: correct answer to at least 1 question out of 3 for each paper. - for grade 10, the detailed knowledge of the practical realization of all the operators of the studied families Specifically: For grade 10: correct answer to all questions	**Test + practical application** At each laboratory students receive a test and a grade. Also, each student receives a note for the activity at the laboratory during the semester and for the file with the laboratory works. This results in an average for the laboratory. The questions are asked based on the reports prepared in the laboratory works.	30%
10.8 Minimum performance standard: Assimilation of detailed knowledge about the construction, operation and design of central processing units for digital computers, as well as about the organization of different types of memories associated with them. The studied design methods are exemplified on existing architectures, including the study of special architectures. The term solution, in individual activities and activities carried out in groups, in conditions of qualified assistance, of the problems that require the application of principles and rules respecting the norms of professional deontology. Responsible assumption of specific tasks in multi-specialized teams and efficient communication at institutional level. Development of team spirit, spirit of mutual help, awareness of the importance of training during the semester for good and sustainable results, awareness of the importance of research, own research related to learning (library, internet), cultivating a discipline of work, done correctly and on time			

Completion date:
25.09.2023

Date of endorsement in the department:
27.09.2023

Date of endorsement in the Faculty Board:

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	Department of Computers and Information Technology
1.4 Field of study	Computers and information technology
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Computers / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject			**Data structures and algorithms**				
2.2 Holder of the subject			**Prof.univ.dr.ing. Zmaranda Doina**				
2.3 Holder of the academic seminar/laboratory/project			**ş.l.dr.ing. Coman Simina**				
2.4 Year of study	**II**	2.5 Semester	**3**	2.6 Type of the evaluation	**Ex**. - Examination	2.7 Subject regime	**FD -** Field Discipline

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**4**	of which: 3.2 course	**2**	3.3 academic seminar/laboratory/project	**2**
3.4 Total of hours from the curriculum	**56**	Of which: 3.5 course	**28**	3.6 academic seminar/laboratory/project	**28**

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	28
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	8
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	25
Tutorials	2
Examinations	6
Other activities.	

3.7 Total of hours for individual study	**69**
3.9 Total of hours per semester	**125**
3.10 Number of credits	**5**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions)
4.2 related to skills	Basic programming skills in C/C++ language

5. Conditions (where applicable)

5.1. for the development of the course	- the course can be held face to face (classroom equipped with computer and video projector) or online; slide-based presentation - attendance at least 50% of the course
5.2.for the development of the academic seminary/laboratory/project	- the laboratory can be held face to face (laboratory room equipped with computers and .NET platform / Visual Studio) or online - mandatory presence at all laboratories - a maximum of 4 laboratory works can be recovered during the semester (30%); - the frequency of laboratory hours below 70% leads to the re-done the discipline

6. Specific skills acquired	
Professional skills	**CP1.** Operating with scientific, engineering and computer science foundations **CP2.** Design of hardware, software and communications components **CP3**. Problem solving using computer science and engineering tools
Transversal skills	

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	The objective of the course is to familiarize students with the variety of existing data structures used in programming as well as with their most representative applications. Thus, through the structure of the course and the laboratory, the main objective is to acquire programming skills by knowing and using specific data structures and algorithms in solving specific applications. The course includes a highly applicative component, containing a large number of examples of algorithms in C++ source code, but without restricting the generality of the presented concepts.
7.2 Specific objectives	▪ The course aims to present different typed of data structures (generalized trees, binary trees, ordered binary trees, AVL trees, B-trees, undirected graphs, directed graphs, weighted graphs) together with the related processing algorithms, as well as the methods in which they can be used to implement different types of applications. ▪ The laboratory, based on the C ++ programming language on .NET/ Visual Studio framework, familiarizes students with practical aspects of solving different types of problems by implementing and adapting specific algorithms and data structures to a given problem

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
Introduction to tree data structure. Concepts. Types of trees.		2
Generalized tree data structure. Tree transversal: preorder, inorder, postorder. Implementation of generalized trees.	Presentation of the course concepts and examples on slides, face to face or online	2
Binary trees. Characteristics. Implementation of binary trees.		2
Ordered binary trees. Minimum height binary trees. Implementation of ordered binary trees.		4
AVL trees. Characteristics. Implementation.		2
B-Trees. Characteristics. Implementation.		2
Introduction to graph data structure. Concepts. Types of graphs: undirected/directed and weighted graphs.		2
Graph structure implementation using adjacency matrix		2
Graph structure implementation using adjacency lists		2
Graph transversal. Graphs Depth First traversal. Graphs Breadth First traversal		2
Weighed graphs. Algorithms for determining minimum spanning tree in graphs. Prim Algorithm. Kruskal (priority search) algorithm.		2
Algorithms for determining minimum path in graphs: Dijkstra algorithm. Floyd algorithm		2
Transitive closure of a graph. Warshall algorithm.		2

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2. 2. http://oopweb.com/Algorithms/Files/Algorithms.html
3. 3. https://www.tutorialspoint.com/data_structures_algorithms/index.htm
4. 4. https://www.geeksforgeeks.org/top-algorithms-and-data-structures-for-competitive-programming/
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8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
Tree structure. Generalized trees.	Students receive practical homework at least a week in advance, and study it. At the beginning of the laboratory, possible implementation solutions for the proposed applications are discussed. Afterwards, the students start implementations (the proposed problems from each laboratory) under the guidance of the teacher.	2
Tree structure. Binary trees.		2
Ordered binary trees. Node search techniques, traversal and ordered binary trees creation		4
Ordered binary trees. Node suppression techniques		2
AVL trees. Techniques for inserting and deleting nodes in AVL trees.		2
B-trees. Techniques for inserting and deleting nodes in B-trees.		2
Graph data structure. Implementing graphs through adjacency matrices. Graph transversal.		2
Graph data structure. Implementing graphs through adjacency lists. Graph transversal		2
Determining the minimum spanning tree of a weighted graph. Prim's algorithm		2
Determining the minimum spanning tree of a weighted graph. Priority search (Kruskal) algorithm		2
Techniques for determining the minimum paths in graphs. Dijkstra's algorithm and Floyd's algorithm		2
Laboratory evaluations and final assessment		4

Bibliography

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2. 2. **Zmaranda Doina**, Bonaciu Marius, Coman Simina - Algoritmi si tehnici de programare, Lucrari practice de laborator, Editie revizuita, Editura Universitatii din Oradea, ISBN 978-606-10-1895-6 , 2017

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline is found in the curriculum of Computers specialization in other university centers that have accredited these specializations (Politehnica University of Timisoara, Bucharest Polytechnic University). Knowledge of the basic data structures presented in within this discipline together with specific algorithms and their application in the development of software represent a fundamental requirement in order to form the necessary programming skills and abilities that were requested by software companies.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard: correct answers gathering 50 points in total are required (40 from questions + 10 points ex officio) For 10: the correct answer to all the questions in the proposed topic is required (100 points)	**Written exam** - the assessment can be done face to face or online Students receive for solving a quiz with several questions, each question tests the mastery of the theoretical concepts presented in the course. Each question has a score; in total, the questions total 90 points; 10 points are awarded ex officio.	40 %
10.6 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard: achieving a functional implementation in proportion of 50% of the applications proposed in the laboratory For 10, detailed knowledge of how to implement all laboratory problems and 100% functional implementation is required	**Practical application** - evaluation can be done face to face or online. At each laboratory, students are evaluated based on their activity (answers to questions, implementation proposals, etc.), evaluations that is finalized at the end of the laboratory by a mark for all activity during the semester. Also, in the last hours of the laboratory, the students were evaluated based on all practical implementation that were given to them during the semester. The average between the mark received from practical evaluation and the mark obtained from the laboratory activity will represent the final mark at the laboratory.	60 %

10.8 Minimum performance standard:

Course:

- knowledge and understanding of data structures used in programming and familiarity with their most representative applications: tree data structure and graph data structure
- familiarization with the main types of trees/graphs processing algorithms and the ways of using tree/graph data structures as well as the specific processing algorithms in solving given problems

Laboratory:

- knowledge in detail of the implementation of the tree data structure in all its variants: generalized trees, binary trees, AVL trees, B-trees and acquiring practical skills regarding their usage, together with specific processing algorithms, in the implementation of programs
- knowledge of the fundamental techniques for implementing the graph structure: implementation using adjacency matrices and implementation using adjacency structures

Completion date: 07.09.2023

Date of endorsement in the department: 27.09.2023

Date of endorsement in the Faculty Board:

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	Department of Computers and Information Technology
1.4 Field of study	Computers and information technology
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Computers / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject			**Object Oriented Programming**				
2.2 Holder of the subject			**Prof.univ.dr.ing. Zmaranda Doina**				
2.3 Holder of the academic seminar/laboratory/project			**Prof.univ.dr.ing. Zmaranda Doina**				
2.4 Year of study	**II**	2.5 Semester	**4**	2.6 Type of the evaluation	**Ex**. - Examination	2.7 Subject regime	**FD -** Field Discipline

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**4**	of which: 3.2 course	**2**	3.3 academic seminar/laboratory/project	**2**
3.4 Total of hours from the curriculum	**56**	Of which: 3.5 course	**28**	3.6 academic seminar/laboratory/project	**28**

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	12
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	10
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	14
Tutorials	2
Examinations	6
Other activities.	

3.7 Total of hours for individual study	**44**
3.9 Total of hours per semester	**100**
3.10 Number of credits	**4**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions)
4.2 related to skills	Basic programming skills

5. Conditions (where applicable)

5.1. for the development of the course	- the course can be held face to face (classroom equipped with computer and video projector) or online; slide-based presentation - attendance at least 50% of the course
5.2.for the development of the academic seminary/laboratory/project	- the laboratory can be held face to face (laboratory room equipped with computers and .NET platform / Visual Studio) or online - mandatory presence at all laboratories - a maximum of 4 laboratory works can be recovered during the semester (30%); - the frequency of laboratory hours below 70% leads to the re-done the discipline

6. Specific skills acquired	
Professional skills	**CP2.** Design of hardware, software and communications components **CP3**. Problem solving using computer science and engineering tools **CP5**. Design, life cycle management, integration and integrity of hardware and communications systems
Transversal skills	

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	The objective of the discipline is to acquire knowledge and to familiarize students with design and implementation methods of software applications using object-oriented approach
7.2 Specific objectives	▪ Starting from the basic concepts of object-oriented programming: encapsulation, inheritance and polymorphism, the course develops and presents advanced concepts such as generic and abstract classes, interfaces, collections of objects, events and delegates, attributes and mechanism of reflection, serialization and multithreading programming. The examples were developed in the C# language, but without restricting the generality of the presented concepts. At the end of the course, some concepts related to access to databases and the concept of an ORM were presented. ▪ The laboratory, developed using the C# language and .NET platform / Visual Studio platform familiarizes students with practical aspects of solving different types of implementation problems using the concepts of object programming

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
Programming paradigms. Basic OOP concepts in C#: classes and objects; namespaces	Presentation of the course concepts and examples on slides, face to face or online	2
Encapsulation and access control.		2
Constructors and destructors. Reference types and value types. Static members. Partial classes.		2
Inheritance. Polymorphism.		4
Abstract classes. Generic classes.		2
Collections of objects. .NET collections: generic collections and non-generic collections. Using LINQ to objects		2
Interfaces. MicroSoft .NET interfaces		2
Serialization. Binary serialization and XML serialization. Handling XML files		2
Events and delegates. Lambda expressions		2
Attributes and the mechanism of reflection		2
Multithreading programming.		2
Access to databases in .NET; using an Object Relational Mapper (ORM) - .NET Entity Framework. Mapping in the Entity Framework; context objects.		4

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6. **D. Zmaranda** - *Proiectarea sistemelor orientate pe obiecte utilizând şabloane de proiectare*, Editura Universităţii,din Oradea, ISBN 978-606-10-0427-0, 332pg., 2011
7. **D.Zmaranda**, *Elemente de programare orientată pe obiecte în limbajul C#*, Editura Universităţii din Oradea, ISBN 978-973-759-522-5, 2008
8. **D. Zmaranda**, C. Rusu, M. Gligor, *Programare orientată pe obiecte cu aplicaţii în Visual C++*, Editura Universităţii din Oradea, ISBN 973-613-681-7, 2004
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10. **D. Zmaranda**, *Elemente de programare orientată pe obiecte utilizînd limbajul C++*, Editura Universităţii din Oradea, ISBN 973-613-013-4, 2001

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8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
Classes and objects in C#. Class hierarchies. Namespaces	Students receive practical work at least a week in advance, and study it. At the beginning of the laboratory, possible implementation solutions for the proposed applications are discussed. Afterwards, the students start implementations (the proposed problems from each laboratory) under the guidance of the teacher.	2
Constructors and destructors. Abstract classes.		2
Inheritance and class hierarchy. Methods/constructors overloading.		4
Polymorphism and dynamic binding.		2
Collections of objects. Non-generic .NET collections.		2
Generic classes and .NET generic collections.		2
Interfaces		4
Serialization		2
Events and delegates. Event programming.		2
Access to databases in.NET		2
Laboratory evaluations and final assessment		4

Bibliography

1. **D.Zmaranda**, A. Nicula, Elemente de programare orientată pe obiecte în limbajul C# - îndrumător de laborator, Editura Universităţii din Oradea, ISBN 978-973-759-523-2, 2008 – versiune electronică actualizată 2022
2. https://uoradea-my.sharepoint.com/personal/rodica_zmaranda_didactic_uoradea_ro/_layouts/15/onedrive.aspx?isAscending=true&id=%2Fpersonal%2Frodica%5Fzmaranda%5Fdidactic%5Fuoradea%5Fro%2FDocuments%2FPOO%2FLAB%5FPOO&sortField=LinkFilename&view=0

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline is found in the curriculum of Computers specialization in other university centers that have accredited these specializations (Politehnica University of Timisoara, Bucharest Polytechnic University). Knowledge of the basic concepts of object-oriented programming together with their application in the development of software applications, presented within this discipline, represent a fundamental requirement in order to form the necessary programming skills and abilities that were requested by software companies.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard: correct answers gathering 50 points in total are required (40 from questions + 10 points ex officio) For 10: the correct answer to all the questions in the proposed topic is required (100 points)	**Written exam** - the assessment can be done face to face or online Students receive for solving a a quiz with several questions, each question tests the mastery of the theoretical concepts presented in the course. Each question has a score; in total, the questions total 90 points; 10 points are awarded ex officio.	40 %
10.6 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard: achieving a functional implementation in proportion of 50% of the applications proposed in the laboratory For 10, detailed knowledge of how to implement all laboratory problems and 100% functional implementation is required	**Practical application** - evaluation can be done face to face or online. At each laboratory, students are evaluated based on their activity (answers to questions, implementation proposals, etc.), evaluations that is finalized at the end of the laboratory by a mark for all activity during the semester. Also, in the last hours of the laboratory, the students were evaluated based on all practical implementation that were given to them during the semester. The average between the mark received from practical evaluation and the mark obtained from the laboratory activity will represent the final mark at the laboratory.	60 %

10.8 Minimum performance standard:

Course:

- understanding the basic and advanced concepts in object-oriented programming, namely: encapsulation, inheritance and polymorphism, together with structures underlying the implementation of these concepts: classes (including generic classes and abstract classes), interfaces, virtual functions, the mechanism of overloading of functions and operators and other
- getting used to other advanced concepts such as serialization of objects, use of threads, attributes, reflection mechanism

Laboratory:

- acquiring practical skills and learning how to develop and implement software applications using object-oriented approach
- familiarization with usage of MicroSoft Visual Studio platform and .NET platform to develop object-oriented applications in the and C# programming language
- applying the principle of code reuse by using the different existing class libraries in the implementation of object-oriented software applications

Completion date: 07.09.2023

Date of endorsement in the department: 27.09.2023

Date of endorsement in the Faculty Board:

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Computers and Information Technology**
1.4 Field of study	**Computers and Information Technology**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Computers / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject		**Programming Paradigms**					
2.2 Holder of the subject		**Pater Alexandrina Mirela**					
2.3 Holder of the academic seminar/laboratory/project		**Zoltan Andras Bacrau**					
2.4 Year of study	II	2.5 Semester	3	2.6 Type of the evaluation	Ex	2.7 Subject regime	SD - Specialized Discipline

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	0/2/0
3.4 Total of hours from the curriculum	56	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	0/28/0
Distribution of time					hours
Study using the manual, course support, bibliography and handwritten notes					28
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					14
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					21
Tutorials					3
Examinations					3
Other activities.					
3.7 Total of hours for individual study	**69**				
3.9 Total of hours per semester	**125**				
3.10 Number of credits	5				

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions)
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	Classroom equipped with video projector and computer. The course can be held face to face or online.

5.2.for the development of the academic seminary/laboratory/project	Laboratory equipped with computers that are connected to the Internet and dedicated software installed. The laboratory / project can be held face to face or online

6. Specific skills acquired	
Professional skills	CP2. Designing hardware, software and communication components
Transversal skills	

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	The course aims to familiarize students with the object-oriented programming technique. The course introduces the basics of object-oriented programming with Java program examples. In the laboratory, students implement and verify on the computer both the programs discussed in the course and other proposed programs, deepening the theoretical and practical notions acquired. It was considered necessary to study a high-level programming language with widespread and topicality, namely the Java language.
7.2 Specific objectives	**Theoretical knowledge:** • Adequate use in professional communication of the concepts of computability, complexity, programming paradigms and modeling of computing and communications systems • Use of specific theories and tools (algorithms, schemes, models, etc.) to explain the operation and structure of software systems • To know the fundamental concepts of object-oriented programming, the concepts of classes and objects, constructors and destroyers, the techniques of overloading operators and functions, the technique of inheritance and derivation of classes, of polymorphism • To know the objective facilities offered by the Java programming language **Skills acquired:** • Master and use the Java programming language • To use in the creation of applications the objective facilities offered by the Java programming language • To solve various problems using the concepts of classes, objects • Solve various problems using the techniques of overloading operators and functions, inheritance and polymorphism • Evaluate and justify the effectiveness of methods chosen for implementation and adopt optimal solutions from different points of view

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
Chapter 1. Fundamental concepts in OOP - The premises of OOP. Fundamental concepts. Short characterization of the Java language.	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Chapter 2. Basics of Java: Object and Driver Classes; Data types and operators; Strings of characters	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Chapter 3. Conditional statements; Statements of control	Powerpoint presentation with the help of the video	2 hours

	projector; free discussions;	
Chapter 4. Strings and exceptions	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Chapter 5. Classes, objects and methods	Powerpoint presentation with the help of the video projector; free discussions;	4 hours
Chapter 6. Parameters and overloading methods.	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Chapter 7. Static modifier and nested classes	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Chapter 8. Inheritance.	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Chapter 9. Polymorphism	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Chapter 10. Java interfaces	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Chapter 11. Abstract and generic classes	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Chapter 12. Collections	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Chapter 13. Sorts and searches	Powerpoint presentation with the help of the video projector; free discussions;	2 hours

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[9] D. Logofătu, *Algoritmi fundamentali în Java*. *Aplicaţii*, Editura Polirom, 2007
https://uoradea-my.sharepoint.com/personal/alexandrina_pater_didactic_uoradea_ro/Documents/PCLP/Programarea%20calculatoarelor%20%C5%9Fi%20limbaje%20de%20programare%20%E2%80%93%20%C3%AEndrum%C4%83tor%20de%20laborator.pdf

8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
Labor protection training Introduction. Technologies used: Eclipse, IntelliJ	Powerpoint presentation with the help of the video projector; Applications - programs; Assistance in using software development;	2 hours
Class and object applications, data types and operators, strings	Powerpoint presentation with the help of the video projector; Applications - programs; Assistance in using software development;	2 hours
Statement applications	Powerpoint presentation with the help of the video projector; Applications - programs; Assistance in using software development;	2 hours
String applications and exceptions	Powerpoint presentation with the help of the video projector; Applications - programs; Assistance in using software development;	2 hours
Class applications, objects and methods	Powerpoint presentation with the help of the video projector; Applications - programs; Assistance in using software development;	2 hours
Applications Parameters and overloading methods	Powerpoint presentation with the help of the video projector; Applications - programs; Assistance in using software development;	2 hours
Static modifier applications and nested classes	Powerpoint presentation with the help of the video projector; Applications - programs; Assistance in using software development;	2 hours
Inheritance applications	Powerpoint presentation with the help of the video projector; Applications - programs; Assistance in	2 hours

	using software development;	
Applications of polymorphism	Powerpoint presentation with the help of the video projector; Applications - programs; Assistance in using software development;	2 hours
Interface applications	Powerpoint presentation with the help of the video projector; Applications - programs; Assistance in using software development;	2 hours
Abstract and generic class applications	Powerpoint presentation with the help of the video projector; Applications - programs; Assistance in using software development;	2 hours
Collection applications	Powerpoint presentation with the help of the video projector; Applications - programs; Assistance in using software development;	2 hours
Sorting and searching applications	Powerpoint presentation with the help of the video projector; Applications - programs; Assistance in using software development;	2 hours
Final test		2 hours

Bibliograpy

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[8] C. S. Horstmann, *Computing concepts with Java 2 Essentials*, 3/e, John Wiley, 2003
[9] D. Logofătu, *Algoritmi fundamentali în Java*. *Aplicaţii*, Editura Polirom, 2007
https://uoradea-my.sharepoint.com/personal/alexandrina_pater_didactic_uoradea_ro/Documents/PCLP/Programarea%20calculatoarelor%20%C5%9Fi%20limbaje%20de%20programare%20%E2%80%93%20%C3%AEndrum%C4%83tor%20de%20laborator.pdf

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

The content of the discipline is found in the curriculum of Computer and Information Technology specialization from other university centers that have accredited these specializations (Technical University of Cluj-Napoca, University of Craiova, "Politehnica" University of Timisoara, Gh. Asachi University of Iasi, etc.) , and knowledge of the basic principles of object-oriented programming and implementation of software components,

implementation of programs in areas of knowledge are stringent requirements of employers in the field (Qubiz, DecIT, Access, Trencadis, Diosoft, Five Tailors, etc.).

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard For 10: Knowledge Understanding	Written paper The evaluation can be done face to face or online	67%
10.5 Academic seminar	-		
10.6 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard For 10:Knowledge and understanding;Ability to explain and interpret;Complete and correct solution of the requirements.	- Laboratory / practical works -Tests during the semester The evaluation can be done face to face or online	33%
10.7 Project			
10.8 Minimum performance standard: Selection and independent use of learned methods and algorithms for known standard situations as well as completion of calculations. Development and implementation of algorithms using learned principles. The timely solution, in individual activities and activities carried out in groups, in conditions of qualified assistance, of the problems that require the application of principles and rules respecting the norms of professional deontology. Modeling a typical engineering problem using the formal apparatus characteristic of the field.			

Completion date: 15.09.2023

Cours instructor Conf.dr.ing. Mirela Pater

Date of endorsement in the department: 27.09.2023

Dean: Prof.dr.ing.habil. Francisc Hathazi

Date of endorsement in the Faculty Board: 29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	Department of Computers and Information Technology
1.4 Field of study	Computers and information technology
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	**Computers/ Bachelor Engineer**

2. Data related to the subject

2.1 Name of the subject	**Systems theory**						
2.2 Holder of the subject	Assoc.Prof. Eng.PhD. Gabor Gianina						
2.3 Holder of the academic seminar/laboratory/project	Assoc.Prof. Eng.PhD. Gabor Gianina						
2.4 Year of study	2nd	2.5 Semester	2nd	2.6 Type of the evaluation	Continuous Assessment	2.7 Subject regime	Domain Discipline

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	3	of which: 3.2 course	2	3.3 laboratory	1
3.4 Total of hours from the curriculum	42	of which: 3.5 course	28	3.6 laboratory	14

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	21
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	7
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	21
Tutorials	3
Examinations	6
Other activities.	

3.7 Total of hours for individual study	**58**
3.9 Total of hours per semester	**100**
3.10 Number of credits	4

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions)
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	face to face or online projector and access to Internet
5.2.for the development of the academic seminary/laboratory/project	face to face or online every student has access to a computer connected to Internet and with access to the applications/software used during the labs

6. Specific skills acquired	
Professional skills	**CP3**. Solving problems using computer science and engineering instruments
Transversal skills	

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ Know and understand the fundamental systemic concepts and how to use them in control system theory as part of a general engineering training at a level that allows the students to approach practical and specific problems, individual study, creative and multidisciplinary technical usage.
7.2 Specific objectives	▪ to understand the fundamental concepts regarding systems and how to use and implement abstract block schemes to different systems ▪ to understand the methods used to determine the input-output mathematical models for linear systems ▪ to understand and use existing methods in order to obtain input-state-output mathematical models for linear systems ▪ to recognize the main system connections used in control system theory, solve/obtain the mathematical models for complex system connections ▪ to know how to work in operational domain and how to use the existing methods in order to solve different systems ▪ to know how to use block scheme algebra and fluency graphs ▪ to understand system stability concept and the methods used to solve linear systems stability ▪ to understand controllability and observability and the methods used to solve linear systems stability ▪ to understand the main control systems structures and the associated controllers

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
Definitions and terminology - system, input and output, abstract models, subsystem, systems connection types, analogue and digital signals, mathematical models, identification	lecture /debate	2
Control system structures - block scheme, operating mode, control problem, fundamental structures used to control systems with and without feedback loop	lecture/debate	2
Mathematical models used for system modelling / input-output mathematical models for analogue and digital systems, input-state-output mathematical models for analogue and digital systems	lecture /debate	2
Main methods used to obtain mathematical models associated to physical systems	lecture /debate	2
Operating modes - operating point, static regime, dynamic regime, steady-state regime, transitional regime, free regime, forced regime, ordinary regime, random regime	lecture /debate	2
Methods used to calculate the matrix and transfer function for continuous	lecture /debate	2

and discrete linear systems considering the time mathematical models		
Transfer functions for linear systems in continuous times using fluency graphs and Mason's formula	lecture /debate	2
Mathematical models for continuous and discrete systems connections in time and block scheme algebra	lecture /debate	2
Linear systems concept and linearization method , main linear transfer elements, main non-linear transfer elements	lecture /debate	2
Response of linear systems in steady-state and transitional regime State transformation/conversion and systemic achievements	lecture /debate	2
System stability concept, fundamental stability theorem and methods used to determine the stability of continuous and discrete systems	lecture /debate	2
Algebraic stability criteria/methods used for linear systems analysis - Hurwitz-Routh and Jury	lecture /debate	2
Controllability and observability of linear systems, Kalman and Hautus criteria	lecture /debate	2
Main control systems structures used in real systems and their associated controllers - P, PI. PD, PID	lecture /debate	2
Bibliography Gianina GABOR, *Teoria sistemelor*, curs, format electronic, reactualizat 2018 & 2020 https://uoradea-my.sharepoint.com/personal/gianina_gabor_didactic_uoradea_ro/Documents/Forms/All.aspx#InplviewHash91928fea-9b64-429c-9b47-11ef26725031=RootFolder%3D%252Fpersonal%252Fgianina%255Fgabor%255Fdidactic%255Fuoradea%255Fro%252FDocuments%252FTS Dragomir T.L. - *Elemente de teoria sistemelor*, colectia Automatica, Editura Politehnica Timişoara, 2004 Voicu M. - *Introducere în automatică (ed.II)*, Editura Polirom, Iaşi, 2002 Levine W.S. - *Control System Fundamentals*, CRC Press, 2000 Astrom K.J., Wittenmark B. - *Computer Controlled Systems*, Prentice Hall, 1997 Dorf R. – *Modern Control Systems*, Adison Reading, 1989		
8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
Fundamental concepts regarding systems and methods used to implement a block scheme for a real system	discuss examples and assign problems to solve	2
Methods used to implement mathematical input-output models for linear systems	discuss examples and assign problems to solve	2
Methods used to implement mathematical input-state-output models for linear systems	discuss examples and assign problems to solve	2
Main systems type connection - serial, parallel, feedback Calculate/solve transfer functions for complex systems	discuss examples and assign problems to solve	2
Block scheme algebra methods used to solve systems transfer function Transfer function of linear systems calculation using fluency graphs and Mason's formula	discuss examples and assign problems to solve	2
Algebraic stability methods used for linear systems analysis - Hurwitz-Routh and Jury criteria	discuss examples and assign problems to solve	2
Controllability and observability of linear systems - Kalman and Hautus criteria	discuss examples and assign problems to solve	2
Bibliography Gianina GABOR, *Teoria sistemelor*, îndrumător de laborator, format electronic, reactualizat 2018 & 2020 https://uoradea-my.sharepoint.com/personal/gianina_gabor_didactic_uoradea_ro/Documents/Forms/All.aspx#InplviewHash91928fea-9b64-429c-9b47-11ef26725031=RootFolder%3D%252Fpersonal%252Fgianina%255Fgabor%255Fdidactic%255Fuoradea%255Fro%252FDocuments%252FTS Dragomir T.L. - *Elemente de teoria sistemelor*, colectia Automatica, Editura Politehnica Timişoara, 2004 Dale S., Negrău M.- *Teoria sistemelor liniare-îndrumător de laborator*, Editura Universităţii din Oradea, 2002 Preitl St. – *Elemente de teoria sistemelor şi reglaj automat,* Editura Politehnica Timişoara, 1996		

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

▪ through the information contained in the lecture and labs the students gain consistent knowledge matching with the required skills

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard For 10: in accordance with the maximum performance standard	face to face or online written test /assignment	60%
10.6 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard For 10: in accordance with the maximum performance standard	face to face or online oral test based on assignments	40%
10.8 Minimum performance standard: Course: 5 Laboratory: 5			

Completion date: 20.09.2023

Date of endorsement in the department: 27.09.2023

Date of endorsement in the Faculty Board: 29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	*Computers and Information Technology*
1.4 Field of study	*Computers and Information Technology*
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	*Computers & Information Technology & Automation and Applied Informatics /* **Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject		*The structure and organization of computers*					
2.2 Holder of the subject		Prof.dr.habil.eng. Daniela Elena Popescu					
2.3 Holder of the academic seminar/laboratory/project		**lect.dr.ing. Mircea-Petru Ursu**					
2.4 Year of study **II**		2.5 Semester **4**		2.6 Type of the evaluation	**Ex**	2.7 Subject regime	**DD**

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**4**	of which: 3.2 course	**2**	3.3 academic seminar/laboratory/project	**2/1**
3.4 Total of hours from the curriculum	**56**	Of which: 3.5 course	**28**	3.6 academic seminar/laboratory/project	**28**

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	28
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	8
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	**14**
Tutorials	2
Examinations	4
Other activities.	

3.7 Total of hours for individual study	**56**
3.9 Total of hours per semester	**112**
3.10 Number of credits	**4**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions)
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	- The course can be held face to face or online " - attendance at least 50% of the courses
5.2.for the development of the academic seminary/laboratory/project	- The seminar / laboratory / project can be held face to face or online - Mandatory presence at all laboratories; - Students must have completed the theoretical part of the paper;

	- A maximum of 4 works can be recovered during the semester (30%); - The frequency at laboratory hours below 70% leads to the restoration of the discipline

6. Specific skills acquired	
Professional skills	CP3. Problem solving using Computer Science and engineering tools CP5. Design, life cycle management, integration and integrity of hardware, software and communications systems
Transversal skills	CT1. Applying, in the context of compliance with the law, intellectual property rights (including technology transfer), product certification methodology, principles, norms and values of the code of professional ethics within its own rigorous, efficient and responsible work strategy CT2. Identify roles and responsibilities in a multi-specialized team decision-making and assigning tasks, with the application of relationship techniques and efficient work within the team

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ The discipline aims to familiarize students with specialization with as much theoretical and practical knowledge related to the structure and operation of computer systems, so that students are able to design and implement computer systems as efficient as possible.
7.2 Specific objectives	• The course aims to present constructive solutions at the architectural level, where the hardware and software concepts complement each other for the benefit of a structure designed and as flexible as possible for users. • The course aims to acquire knowledge on how to operate and use the components of the structure of a computer, as well as the development of programming skills of the hardware structure • Laboratory: Fixing the architecture, the external interface signals and the instruction set, for the sequential multiplication device. Realization of the data processing unit at the level of the unit being designed, implementation of the control unit and the block of control circuits

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
Chapter I. Basic notions related to the architecture, organization, function and structure of computers The basic structure of a computer system. Description of its functional units: Input unit, Extraction unit, Internal memory, External memory. Arithmetic and Logic Unit and Command Unit. Using addressing with the base. Possibilities for addressing operands in computers with General registers. Addressing operands in computers through general registers. The way in which the operands are brought Execution of the instruction. Sequencing. Generation of synchronization pulses with variable period, and prescribed duration, conditioning possibilities. The cycle of carrying out the instruction as a whole.	• Free course presentation with video projector / overhead projector and blackboard in an interactive way: punctuate from time to time questions for students in order to increase the degree of interactivity • Indication of topics for documentation and individual study	6 hours
Chapter II Memory		16 hours

The structure of working memory (OM). RAM memory. Memory organized in blocks. Memory organized on modules. Memory with multiple access points. Cache memory Fast buffer with modular structure. Cache memory organized with blocks with arbitrary correspondence. Cache memory with arbitrary addressing by sectors. Cache memory addressing on databases. Associative memory (AM). Complete associative memory. Stack memory. Buffer memory. Memory protection. External memory. Virtual memory Static memory allocation. Dynamic memory allocation. Dynamic relocation. Example of dynam allocation and relocation device.		
Chapter. III Central processing unit. Structure of the Arithmetic and Logic Unit (ALU). The adder. Central unit. UC structure. Bringing the instruction to the IBM 360. Blocking the circuit for fetching data. Generating orders. Microprogrammed control. Interrupt circuit block		6 hours

Bibliography

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- William Stalings, Computer Organization and Architecture, 9th Edition, March 11, 2012 | ISBN-10: 013293633X | ISBN-13: 978-0132936330, Computer Science Series
- Popescu Daniela E .. - Architecture and organization of conventional computing systems ,, University of Oradea Publishing House, Oradea, 2002, ISBN 973-613-225-0, 2002
- D.E.Popescu, C.Popescu, Architecture of computer systems, University Publishing House, laboratory supervisor, ISBN 973-613-225-9, 2002
- Popescu Daniela E., Introduction to the architecture of computer systems, MATRIX ROM Bucharest publishing house, ISBN 973 - 685-067 –6
- K.Hwang, F.A. Briggs - Computer Architecture and Parallel processing, Treira Publishing House, Mc Graw - Hill Book company 1987
- Mircea Popa, Introductions in parallel and unconventional architectures, AS Computer Press Publishing House Timişoara 1992

8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
11. Presentation of the laboratory, labor protection norms and conventional signs specific to the field of computer systems - general information on the architecture of computer systems. 2. Coding of information in computer systems - addition and subtraction in complement to 2. 3. Multiplication and division operations in complement to 2. 4. The structure of the data processing part for the arithmetic and logic unit. 5. Implementation of the control unit for ALU by the state table method. 6. Assessment of knowledge. 7. Implementation of the control unit for ALU by the method of the delay element. 8. Implementation of the control unit for ALU by the method of the numerator in sequence. Comparisons between the three methods. 9. Assessment of knowledge. 10. Wired implementation of the control unit of a processor with a reduced set of instructions by the method of the numerator in sequence. 11. Methods of microprogrammed implementation of the control unit for a multiplier in complement to 2.	In each laboratory class, with the help of the video projector, the theoretical part is deepened by examples (which illustrate calculation methods, particular cases, error prevention, etc.), then students are asked to solve practical applications. The evaluation of students is done through two tests. The arithmetic mean of the marks of these tests represents the mark with which they enter the exam.	2 hours are allocated for each of the 14 detailed points of the laboratory activity.

12. Microprogrammed implementation of the control unit for a microprocessor. 13. Assessment of knowledge. 14. Recovery of laboratories and conclusion of the situation.		

Bibliography

1. D.E.Popescu, C.Popescu, Arhitectura sistemelor de calcul, EdituraUniversitati, îndrumător de laborator, ISBN 973-613-225-9, 2002
2. William Stalings, Computer Organization and Architecture, 9th Edition, March 11, 2012 | ISBN-10: 013293633X | ISBN-13: 978-0132936330, Computer Science Series

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline is found in the curriculum of Computer and Information Technology specializations and other university centers that have accredited these specializations (Technical University of Cluj-Napoca, University of Craiova, "Politehnica" University of Timisoara, Gh. Asachi University of Iasi, etc.), and knowledge of the architecture and organization of computer systems as well as their operation and design is a stringent requirement of employers in the field (Rds & Rcs, Plexus, Neologic, Celestica, Keysys, etc.).

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5) in accordance with the minimum performance standard: - it is necessary to know the fundamental notions required in the subjects, without presenting details on them For 10: - for grade 10, a thorough knowledge of all is required	The evaluation can be done face to face or online depending on the situation imposed	70%
10.6 Laboratory	- for grade 5, broadly knowing the problems of artificial intelligence Specifically: For grade 5: correct answer to at least 1 question out of 3 for each paper. - for grade 10, detailed knowledge of search algorithms, optimization and problems related to evolutionary computation, respectively neural networks Specifically: For grade 10: correct answer to all questions.	**Tests during the semester** The evaluation of students is done through two tests, taken during the semester. The arithmetic mean of the marks of these tests represents the mark with which they enter the exam. Students can also get extra points, depending on their participation in the laboratory and solving exercises with a higher degree of difficulty. These points can be used to calculate the test score.	30%
10.8 Minimum performance standard: Assimilation of detailed knowledge about the construction, operation and design of central processing units for digital computers, as well as about the organization of different types of memories associated with them. The studied design methods are exemplified on existing architectures, including the study of special architectures.			

The term solution, in individual activities and activities carried out in groups, in conditions of qualified assistance, of the problems that require the application of principles and rules respecting the norms of professional deontology. Responsible assumption of specific tasks in multi-specialized teams and efficient communication at institutional level. Development of team spirit, spirit of mutual help, awareness of the importance of training during the semester for good and sustainable results, awareness of the importance of research, own research related to learning (library, internet), cultivating a discipline of work, done correctly and on time

Completion date:
25.09.2023

Date of endorsement in the department:
27.09.2023

Date of endorsement in the Faculty Board:

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	Department of Computers and Information Technology
1.4 Field of study	Computers and information technology
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	**Computers/ Bachelor Engineer**

2. Data related to the subject

2.1 Name of the subject		**User Interface Design**					
2.2 Holder of the subject		Assoc.Prof.Eng.PhD. Gabor Gianina					
2.3 Holder of the academic seminar/laboratory/project		Assoc.Prof. Eng.PhD. Gabor Gianina Eng.Magics-Verkman Hannelore					
2.4 Year of study	2nd	2.5 Semester	1st	2.6 Type of the evaluation	Examination	2.7 Subject regime	Specialized Discipline

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 laboratory/project	1/1
3.4 Total of hours from the curriculum	56	of which: 3.5 course	28	3.6 seminar laboratory/project	14/14

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	21
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	8
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	30
Tutorials	4
Examinations	6
Other activities.	

3.7 Total of hours for individual study	**69**
3.9 Total of hours per semester	**125**
3.10 Number of credits	**5**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions)
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	face to face or online projector and access to Internet
5.2.for the development of the academic seminary/laboratory/project	face to face or online every student has access to a computer connected to Internet and with access to the applications/software used during the labs

6. Specific skills acquired	
Professional skills	**CP3**. Solving problems using computer science and engineering instruments **CP4.** Computer systems design and integration using technologies and programming environments.
Transversal skills	**CT3.** Demonstration of initiative and action for updating professional, economic knowledge and organizational culture.

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ Know and understand how to design and implement an application with a functional complete and usable interface, the methods used to remove useless elements from software applications in order to select the good design ideas and the best way to design and develop a web application. The intent of the course, labs and project is to use HTML5, CSS3, Javascript/jQuery to design and develop the frontend part of a responsive web site
7.2 Specific objectives	▪ to understand and use the elements of HTML5 in order to design and develop a responsive web site ▪ to know how to work and use tables, frames, fonts, control element, lists and forms in HTML5 ▪ to know how to design and develop interactive web pages with useful and readable content ▪ to know how to use in implement audio, video and images in order to develop an interactive web site ▪ understand and know how to use stiles and CSS3 elements, Javascript/jQuery for responsive web page development ▪ to know and understand how to design and develop a complete frontend part of a web responsive site

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
Interfaces -definition and terminology, areas of interest for usable and used interfaces, methods used to develop interfaces, the future of web interfaces New aspects of human-computer interaction, different types of interfaces, methods used to design and develop interfaces	lecture & debate	2
Interfaces for web applications - special requests and interaction design, design methods and browsing strategies Web site design - web site structure, layout, visual flow, chromatic, content, accessibility, steps used in interactive web design	lecture & debate	2
HTML5 - new elements used foe web design, new sematic elements - text, fields, webmail, numbers, controls HTML5 - forms and forms validation, microdata, events &information, speech	lecture &debate	2
HTML5 – canvas 2D, canvas 3D and inline SVG HTML5 - audio & video elements, videos on pe web HTML 5 – native drag and drop, desktop drag, web socket, messaging, web workers, device orientation, geolocation	lecture & debate	2
CSS3 - definition, anathomy of a line style, style types, selectors used CSS3 - webfonts, text wrapping, columns, opacity, rounded corners, gradient, shadows, background, border image, flexible box, 2D and 3D transforms,	lecture & debate	2

animations, transitions, multiple columns, user interface		
JavaScript - syntax and reserved word, data types - number, string, boolean, object, null, undefined, NaN, Infinity; strings and methods used for strings, operators, control elements – if...else, switch, while, do...while,for, try...catch...finaly ; objects, arrays, functions, classes. JavaScript & HTML5 - inserting images and slide-shows	lecture & debate	2
Responsive web design – definition, required elements, steps used to design and develop responsive design pages, advantages and disadvantages. Responsive web design pages - case studies	lecture & debate	2
Responsive web design & framework-uri. Bootstrap and responsive web design - system grids, typography, tables, lists, groups, images, video elements.	lecture & debate	2
User interfaces - interface views, interaction design, interface realities in the design proccess, user types, utilizability rules, design models and methods/methodologies used to design interface, standards and regulations	lecture & debate	2
Human capacities. Desktop application / vizual design - elements, aspects, dimensions, rules, strategies, visual flow, interface structure	lecture & debate	2
Mobile phone interfaces - evolutionm control web elements, interfaces, design concepts.. Methods used to design and develop a web site for mobile phones.	lecture & debate	2
Comparative study regarding the design and development of a interface for a desktop and mobile device. Update and maintenance of web pages.	lecture & debate	2
JavaScript/jQuery – syntax, selectors, jQuery & HTML, jQuery & CSS methods, events, attibutes. JavaScript/jQuery mobile – basic structure, page data roles, basic lists, list view role, links between pages, pick and use implicit themes, virtual pages, page navigation, dialogs, buttons, symbols, toolbars, forms elements, events	lecture & debate	2
Search Engine Optimization (SEO) techniques. Web site architecture and SEO optimization.	lecture & debate	2

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Gianina GABOR, *Proiectarea interfetelor utilizator*, curs, format electronic

J.W.Satzinger, R.B.Jackson, S.D.Burd, *Introduction to Systems Analysis and Design: An Agile Iterative Approach*, 6th edition, Cengage Technology Edition, 2014

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http://www.smashingmagazine.com/learning-css3-useful-reference-guide/ consultat la 5.07.2014

Gianina Gabor**,** Moisi Elisa, "Proiectarea interfețelor utilizator.Teorie și aplicații", Editura Universităţii din Oradea ISBN 978-606-10-1718-8, 2015(carte pe CD)

8.3 Laboratory	Teaching methods	No. of hours/ Observations
Interaction design, UX design (user experience), user flow, user flow charts, wireframes and user flow charts, develop wireframes and user flow charts for an existing application	examples and assigned problems	1
Develop and implement a web site based on an imposed structure and its required design using HTML5 elements	examples and assigned problems	1
Insert and use new CSS3 elements on the above web site developed according to the design requests	examples and assigned problems	1
Javascript - insert Javascript elements in the developed web site	examples and	1

	assigned problems	
Use media queries and fluid grids to develop responsive web pages in the website	examples and assigned problems	1
Add new responsive pages in the existing web site	examples and assigned problems	1
Final design elements included in the web site	examples and assigned problems	1
8.4 Project	Teaching methods	No. of hours/ Observations
Choosing a theme for a 3 level strict hierarchy structure responsive web site	examples and assigned problems	1
Web design - contextual analysis	examples and assigned problems	1
Web site design - first design ideas and feedback	examples and assigned problems	1
Web site design - interactive prototype	examples and assigned problems	1
Develop the responsive web site - the home page and 2-3 pages of the second level	examples and assigned problems	1
Develop the responsive web site - insert the pages from the third level from the web site	examples and assigned problems	1
Final project/web site presentation - PowerPoint presentation and source code	examples and assigned problems	1

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Mark Pilgrim , *HTML5: Ghidul incepatorului*, 3D Media communications – traducere „Dive into HTML5", Brasov, 2011

G.B. Shelly, D.M. Woods, W.J. Dorin, *HTML5 and CSS Comprehensive*, Seventh Edition, International Edition, Course Technology, Cengage Learning, 2013

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http://coding.smashingmagazine.com/2011/08/10/techniques-for-gracefully-degrading-media-queries/ consultat la 1.06.2014

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9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- through the information contained in the lecture and labs the students gain consistent knowledge matching with the required skills

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard For 10: in accordance with the maximum performance standard	face to face or online written test /assignment	40%

10.6 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard For 10: in accordance with the maximum performance standard	face to face or online oral based on assignments	30%
10.7 Project	Minimum required conditions for promotion (grade 6): in accordance with the minimum performance standard For 10: in accordance with the maximum performance standard	face to face or online oral presentation of the developed and implemented web site	30%
10.8 Minimum performance standard: Course: 5 Laboratory: 5 Project:6			

Completion date: 20.09.2023

Date of endorsement in the department: 27.09.2023

Date of endorsement in the Faculty Board: 2909.2023

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	Department of Computers and Information Technology
1.4 Field of study	Computers and information technology
1.5 Study cycle	Bachelor
1.6 Study program/Qualification	Computers/ Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject		**Applications of database management systems**					
2.2 Holder of the subject		Prof. dr. ing. Győrödi Cornelia Aurora					
2.3 Holder of the academic seminar/laboratory/project		Sef. Lucr. Dr. Ing. Pecherle George Dominic					
2.4 Year of study	III	2.5 Semester	1	2.6 Type of the evaluation	Ex	2.7 Subject regime	SD

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	0/2/1
3.4 Total of hours from the curriculum	70	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	0/28/14

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	18
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	10
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	10
Tutorials	4
Examinations	2
Other activities.	

3.7 Total of hours for individual study	**80**
3.9 Total of hours per semester	**100**
3.10 Number of credits	6

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions) Databases course
4.2 related to skills	Understanding the theoretical and practical knowledge used to the design and implementation of relational database management applications.

5. Conditions (where applicable)

5.1. for the development of the course	Classroom equipped with video projector and computer - The course can be held face to face or online
5.2.for the development of the academic seminary/laboratory/project	Laboratory equipped with video projector and computers that are connected to the internet, and they have installed Oracle 12c software. The laboratory can take place face to face or online

6. Specific skills acquired	
Professional skills	C2. Designing hardware, software and communication components C3. Solving problems using computer science and engineering instruments
Transversal skills	

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ Learning the advanced concepts of relational databases and the PL/SQL language to optimize the interface of applications with the database or other applications.
7.2 Specific objectives	▪ Advanced concepts of relational databases, namely: The PL / SQL relational language, stored procedures and functions, triggers, packages, database security control, transaction management as well as object-oriented database concepts.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. PL/SQL language	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
2. Data manipulation using PL/SQL language. Control structures in PL/SQL		2 hours
3. Data types composed in PL/SQL. Defining cursors. Cursors with parameters. Exceptions in PL/SQL		4 hours
4. Stored procedures and functions		2 hours
5. Packages		2 hours
6. Dynamic SQL		2 hours
7. Libraries and Languages for Programming		2 hours
8. Security control of database		2 hours
9. Transaction control		2 hours
10. Interlock study		2 hours
11. Restoring the database		4 hours
12. Object-oriented databases. Principles of object modeling		

Bibliography

1. Ion Lungu, Anca Andreescu, Adela Bâra, Anda Belciu, Constanța Bodea, Iuliana Botha, Vlad Diaconița, Alexandra Florea, **Cornelia Győrödi**, " Tratat de baze de date. Sisteme de gestiune a bazelor de date ", Volumul 2, Editura ASE, 2015, ISBN 978-606-505-472-1, nr. pag 375.
2. Győrödi Cornelia, Pecherle George, "*Baze de date relaţionale. Teorie și aplicații în Oracle*"**,** Editura Universitati, 2008, ISBN 978-973-759-460-0.
3. Baze de date relaţionale. Concepte avansate - Győrödi Cornelia, Győrödi Robert, Editura Treira – 2000, ISBN 973-8159-22-9.
4. David M. Kroenke, David J. Auer – Database Processing: Fundamentals, Design and Implementation, 15th Edition, Pearson, 2019, ISBN: 978-0134802749.

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6. Abraham Silberschatz, Database System Concepts, 7th Ed., McGraw-Hill, 2019, ISBN 9780078022159.
7. Oracle Education."Develop PL/SQL Program Units", Oracle Corporation, 2019.
8. Oracle Education."PL/SQL Fundamentals", Oracle Corporation, 2019.
9. Oracle Academy iLearning (https://academy.oracle.com)
10. https://e.uoradea.ro/course/view.php?id=6138 Materials (courses and laboratories)

8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
1. Getting started with database management systems. Installing and configuring Oracle SQL Developer Data Modeler systems, Oracle 12c.	Oral presentation. Students work with the following tool: -Oracle Application Express (https://iacademy.oracle.com/) The students are assessed by a practical test using computer from laboratory topics.	2 hours
2. Entity-relationship diagram for a practical application.		2 hours
3. Normalization of the relational database. Normal forms FN1, FN2, FN3, FNCB of the concept model. Practical applications - case study.		2 hours
4. Transforming the conceptual model into a physical model. Practical applications - case study.		4 hours
5. SQL language. The SQL command for querying a table		2 hours
6. Join operations in SQL language		2 hours
7. The Data manipulation language in SQL. Defining of index files and views		2 hours
8. Advanced join techniques		2 hours
9. Aggregate functions in SQL		2 hours
10. Subqueries in SQL. Sets of operators in SQL		2 hours
11. Controlling access to the relational database. GRANT and REVOKE commands.		2 hours
12. Transaction control in the relational database. Commit, Savepoint and Rollback commands.		2 hours
13. Design and implementation of a library management application.		
14. Final test		2 hours

Bibliography

1. Ion Lungu, Anca Andreescu, Adela Bâra, Anda Belciu, Constanța Bodea, Iuliana Botha, Vlad Diaconița, Alexandra Florea, **Cornelia Győrödi**, " Tratat de baze de date. Sisteme de gestiune a bazelor de date ", Volumul 2, Editura ASE, 2015, ISBN 978-606-505-472-1, nr. pag 375.
2. Győrödi Cornelia**,** Lungu Ion "*Sisteme de baze de date avansate*", Editura Universității din Oradea, 2011, ISBN 978-606-10-0447-8, nr. pag 350.
3. Győrödi Cornelia, Pecherle George, "*Baze de date relaţionale. Teorie și aplicații în Oracle*"**,** Editura Universitati, 2008, ISBN 978-973-759-460-0.
4. Oracle Application Express (https://iacademy.oracle.com/)
5. Oracle Academy iLearning (https://academy.oracle.com)
6. https://e.uoradea.ro/course/view.php?id=6138 Materials (courses and laboratories)

8.3. Project	Teaching methods	No. of hours/ Observations
Implementing a practical application from a list published on the online platform https://e.uoradea.ro/course/view.php?id=6138 The project will be implemented in one of the development environments: Oracle Server (Oracle Database 11g or Oracle12, Oracle Developer Suite 12), MySQL 8, or SQL Server 2018. For each project, both the practical application and a description in the form of a report will be presented. The report will contain: (a) Analysis and specification of the requirements and operation of the designed	Oral presentation	1 hours/ week 14 hours

application. (b) Description and interpretation of results obtained.		

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

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10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard: 50% of the subjects from the final exam should be correctly solved For 10: 100% of the subjects from the final exam should be correctly solved	Semester exam – written	50%
10.5 Academic seminar	Minimum required conditions for passing the examination (grade 5): in accordance with the minimum performance standard - For 10:	-	-
10.6 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard: 50% of the problems from the final laboratory test should be correctly solved - For 10: 100% of the problems from the final laboratory test should be correctly solved	Oral/written	20%
10.7 Project	A small-scale individual practical application project covering the topics mentioned in the laboratory list	Project Evaluations - oral presentations	30%

10.8 Minimum performance standard: Course: 50% of the maximum score of the final exam Academic seminar: Laboratory: 50% of the maximum score of the laboratory evaluations Project: 50% of the maximum score of the Project Evaluations

	Course instructor	Head of department
Completion date: **25.09.2023**	prof. dr. ing. Cornelia Győrödi E-mail: cgyorodi@uoradea.ro	conf. dr. ing. Pater Mirela

Date of endorsement in the department:
27.09.2023

Date of endorsement in the Faculty Board:
29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	*Computers and Information Technology*
1.4 Field of study	*Computers and Information Technology*
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	*Computers & Information Technology /* **Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject		*Artificial Intelligence*					
2.2 Holder of the subject		Prof.dr.habil.eng. Daniela Elena Popescu					
2.3 Holder of the academic seminar/laboratory/project		**lect.dr.ing. Elisa Moisi**					
2.4 Year of study **III**		2.5 Semester **6**		2.6 Type of the evaluation	**Cv**	2.7 Subject regime	**DD**

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**4**	of which: 3.2 course	**2**	3.3 academic seminar/laboratory/project	**1**
3.4 Total of hours from the curriculum	**56**	Of which: 3.5 course	**28**	3.6 academic seminar/laboratory/project	**14**

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	28
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	14
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	22
Tutorials	2
Examinations	4
Other activities.	

3.7 Total of hours for individual study	**70**
3.9 Total of hours per semester	**112**
3.10 Number of credits	**4**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions)
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	- The course can be held face to face or online " - attendance at least 50% of the courses
5.2.for the development of the academic seminary/laboratory/project	- The seminar / laboratory / project can be held face to face or online - Mandatory presence at all laboratories; - Students must have completed the theoretical part of the paper; - A maximum of 4 works can be recovered during the semester (30%);

	- The frequency at laboratory hours below 70% leads to the restoration of the discipline
6. Specific skills acquired	
Professional skills	CP3. Problem solving using Computer Science and engineering tools CP5. Design, life cycle management, integration and integrity of hardware, software and communications systems
Transversal skills	CT1. Applying, in the context of compliance with the law, intellectual property rights (including technology transfer), product certification methodology, principles, norms and values of the code of professional ethics within its own rigorous, efficient and responsible work strategy CT2. Identify roles and responsibilities in a multi-specialized team decision-making and assigning tasks, with the application of relationship techniques and efficient work within the team

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ The discipline aims to familiarize students from specialization with issues related to the general issue of artificial intelligence, with special emphasis on search and optimization techniques
7.2 Specific objectives	• The course aims to present the basic characteristics of the search techniques used in AI, the optimization techniques based on evolutionary calculation, respectively the general notions related to neural networks. • Laboratory: Presentation of the Python language and its use in the implementation of specific search algorithms IA

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
• Introduction to AI. Definitions, Domains of AI. Agent definitions. Multi-agent systems. Intelligence of agents. Examples. Sub-fields of research • Search strategies. Uninformed search. Informed search. Local search algorithms. • Evolutionary computing. Genetic algorithms. Optimization with ant colonies. The constraint satisfaction problem, strategies in games. • Machine Learning. Key concepts and data analysis. The main concepts of machine learning. Data Preprocessing (Data Analysis with Pandas, Data Visualization and Reporting Tools). Data manipulation and transformation techniques. (Techniques for handling missing values, Treatment of extreme values, Treatment of rare categories. Multiple techniques for treatment of categorical variables, Data processing and transformation techniques required for the main groups of machine learning algorithms) • Supervised learning. Unsupervised learning - Clustering. Overfitting and comparative	• Free course presentation with video projector / overhead projector and blackboard in an interactive way: punctuate from time to time questions for students in order to increase the degree of interactivity • Indication of topics for documentation and individual study	28 hours

validation. Classification and regression models (Linear regression. Logical regression. Binary classification. Multi-class classification). Hyperparameter optimization techniques using Scikit-learn. Model selection and validation. Kaggle competitions • Neural networks. Deep Learning. Unidirectional networks ("feed-forward"), convolutional networks, recurrent networks		

Bibliography

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- T. M. Mitchell, Machine Learning,McGraw-Hill Science, 1997
- Machine Learning For Absolute Beginners by Oliver Theobald, 2016, https://www.pdfdrive.com/machine-learning-for-absolute-beginners-e188007429.html
- Vladu Ecaterina – Inteligenta artificiala, Editura universitatii din Oradea, ISBN 973-685-123-0
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- D. Poole, A. Mackworth, R. Goebel. Computational Intelligence – a Logical Approach. Oxford University Press, 1998. http://www.cs.ubc.ca/~poole/ci.html
- AWS Academy (www.wasacademy.com) , AWS Academy Machine Learning Foundations [3790] – Educator, 2022
- https://www.kaggle.com
- https://scikit-learn.org/stable/
- Popescu Daniela Elena, Slide-uri curs incarcate pe platform Moodle

8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
1. Presentation of the laboratory, labor protection rules and basic Python libraries for ML 2. ML applications - regression - "Stock prices" with scikit-learn 3. ML applications - classification - "spam detection" with scikit-learn 4. ML applications - clustering - with scikit-learn 5. Use of Microsoft Azure automated learning 6. Use Microsoft Azure Designer 7. Connect to the Kaggle platform - view ongoing competitions and register as a competitor	Students receive laboratory papers at least one week in advance, study them, inspect them, and take a theoretical test at the beginning of the laboratory. Then, the students carry out the practical part of the work under the guidance of the teacher.	2 hours are allocated for each of the 14 detailed points of the laboratory activity.

Bibliography

1. Platforma Office 365 cu lucrarile de laborator
2. https://www.kaggle.com
3. https://scikit-learn.org/stable/

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline is found in the curriculum of Computer and Information Technology specializations and other university centers that have accredited these specializations (Technical University of Cluj-Napoca, University of Craiova, "Politehnica" University of Timisoara, Gh. Asachi University of Iasi, etc.), and knowledge of the architecture and organization of computer systems as well as their operation and design is a stringent requirement of employers in the field (Rds & Rcs, Plexus, Neologic, Celestica, Keysys, etc.).

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark

10.4 Course	Minimum required conditions for passing the exam (mark 5) in accordance with the minimum performance standard: - it is necessary to know the fundamental notions required in the subjects, without presenting details on them For 10: - for grade 10, a thorough knowledge of all is required	The evaluation can be done face to face or online depending on the situation imposed	60%
10.6 Laboratory	- for grade 5, broadly knowing the problems of artificial intelligence Specifically: For grade 5: correct answer to at least 1 question out of 3 for each paper. - for grade 10, detailed knowledge of search algorithms, optimization and problems related to evolutionary computation, respectively neural networks Specifically: For grade 10: correct answer to all questions.	**Test + practical application** At each laboratory students receive a test and a grade. Also, each student receives a note for the activity at the laboratory during the semester and for the file with the laboratory works. This results in an average for the laboratory. The questions are asked based on the reports prepared in the laboratory works.	40%
10.8 Minimum performance standard: Assimilation of detailed knowledge about the construction, operation and design of central processing units for digital computers, as well as about the organization of different types of memories associated with them. The studied design methods are exemplified on existing architectures, including the study of special architectures. The term solution, in individual activities and activities carried out in groups, in conditions of qualified assistance, of the problems that require the application of principles and rules respecting the norms of professional deontology. Responsible assumption of specific tasks in multi-specialized teams and efficient communication at institutional level. Development of team spirit, spirit of mutual help, awareness of the importance of training during the semester for good and sustainable results, awareness of the importance of research, own research related to learning (library, internet), cultivating a discipline of work, done correctly and on time			

Completion date:
25.09.2023

Date of endorsement in the department:
27.09.2023

Date of endorsement in the Faculty Board:

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	Department of Computers and Information Technology
1.4 Field of study	Computers and Information Technology
1.5 Study cycle	Bachelor
1.6 Study program/Qualification	Computers/ Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject		**Advanced Operating Systems**					
2.2 Holder of the subject		Prof. dr. ing. Gyorodi Robert Stefan					
2.3 Holder of the academic seminar/laboratory/project		Sef. Lucr. Dr. Ing. Pecherle George Dominic Sef. Lucr. Dr. Inf. Costea Mirabela					
2.4 Year of study	III	2.5 Semester	2	2.6 Type of the evaluation	Ex	2.7 Subject regime	SD

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	0/2/1
3.4 Total of hours from the curriculum	70	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	0/28/14

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	10
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	8
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	8
Tutorials	2
Examinations	2
Other activities.	

3.7 Total of hours for individual study	**30**
3.9 Total of hours per semester	**100**
3.10 Number of credits	4

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions) Operating systems
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	Classroom equipped with video projector and computer. The course can be held face to face or online
5.2.for the development of the academic seminary/laboratory/project	Laboratory equipped with video projector and computers that are connected to the internet. They have installed Visual Studio 2019; Linux server with development tools using the C / C ++ language, CLion, Oracle

	VirtualBox for running virtual machines. The laboratory can take place face to face or online
6. Specific skills acquired	
Professional skills	C2. Designing hardware, software and communication components C5. Designing, lifecycle management, integration and integrity of hardware, software and communication systems
Transversal skills	

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ Learning the advanced concepts of operating systems and the possibilities of developing applications based on them.
7.2 Specific objectives	▪ The course is a continuation of the Operating Systems course and focuses on more advanced operating system design concepts, namely: the architecture and basic concepts of UNIX / Linux operating systems, Windows and the Win32 / 64 subsystem.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Win32/64 System - Evolution and System Components	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
2. Win32/64 System - File Subsystem – NTFS, FAT, ReFS		4 hours
3. Win32/64 System - Principles of designing an application		2 hours
4. Win32/64 System - Case Study - Designing a Model Application		2 hours
5. Win32/64 System - Thread Execution		2 hours
6. Win32/64 System – Services		2 hours
7. Win32/64 System - Network Communication and Security System		2 hours
8. Memory Management		2 hours
9. Virtual Memory		2 hours
10. Storage Systems		2 hours
11. File system interface		2 hours
12. Implementing file systems		
13. I/O subsystems		2 hours
14. Protection		2 hours

Bibliography

1. Sisteme de Operare. Teorie şi Aplicaţii – Robert Győrödi – Editura Universităţii din Oradea, 2000, ISBN 973-8083-22-2
2. Operating System Concepts Global 10th Ed - Abraham Silberschatz, Peter Galvin and Greg Gagne - John Wiley & Sons, Inc., 2019, ISBN 1119454085
3. Operating Systems: Internals and Design Principles, 9/E - William Stallings - Pearson, 2018, ISBN 9781292214344

<table>
<tr><td colspan="3">4. Modern Operating Systems: Global Edition, 4/E - Tanenbaum - Pearson – 2015, ISBN 1292061421
5. Distributed Systems, 3.01 - M. van Steen, A. S. Tanenbaum - 2017, ISBN 9789081540629
6. The Linux Programming Interface - Michael Kerrisk - No Starch Press - 2010, ISBN 978-1-59327-220-3
7. Hands-On System Programming with Linux - Kaiwan N Billimoria - Packt Publishing - 2018, ISBN 978-1-78899-847-5
8. PowerShell for SysAdmins - Adam Bertram - No Starch Press - 2020, ISBN 1593279183
9. https://e.uoradea.ro/course/view.php?id=6139 Materials (courses and laboratories)</td></tr>
<tr><td>8.2 Academic laboratory</td><td>Teaching methods</td><td>No. of hours/ Observations</td></tr>
<tr><td>1. Interprocess communication through messages</td><td rowspan="11">Powerpoint presentation with the help of the video projector/Oral presentation.

The students are assessed by a practical test using computer from laboratory topics.</td><td>2 hours</td></tr>
<tr><td>2. Interprocess communication through Shared Memory</td><td>2 hours</td></tr>
<tr><td>3. Interprocess communication through Sockets</td><td>4 hours</td></tr>
<tr><td>4. Introduction to using WIN32 API functions.</td><td>4 hours</td></tr>
<tr><td>5. Working with directories/ folders.</td><td>2 hours</td></tr>
<tr><td>6. File management</td><td>2 hours</td></tr>
<tr><td>7. Threads</td><td>4 hours</td></tr>
<tr><td>8. Services</td><td>4 hours</td></tr>
<tr><td>9. The principles of realization of a WIN32 application.</td><td>4 hours</td></tr>
<tr><td>10. Working with files and process management in UNIX</td><td>2 hours</td></tr>
<tr><td>11. Final test</td><td>2 hours</td></tr>
<tr><td>8.3. Project</td><td>Teaching methods</td><td>No. of hours/ Observations</td></tr>
<tr><td>Carrying out experiments related to:
• visualization of the internal structures of an operating system in execution
• viewing loaded drivers and tracking I / O activities
• viewing security structures and associated tokens

You can choose from the following themes:
• a file system driver with a given structure and its integration into the Windows system using the Windows Driver Development Kit for the kernel-level driver OR one of the existing libraries that allow the implementation of a user-level driver
• a shell that can be integrated into the Linux or Windows operating system
• an operating system kernel with basic subsystems (processes, process planning, memory management, simple file subsystem) - team project</td><td>A practical application project covering one of the topics mentioned in the project list.

Project evaluation:
- compliance with the requirements of the chosen theme: 25%
- installation, compilation and operation of the program: 25%
- content of the report: 25%
- verification of theoretical knowledge related to the realization of the project: 25%</td><td>1 hours/ week

14 hours</td></tr>
<tr><td colspan="3">Bibliography
1. Győrödi Robert, Mogyorosi Stefan “Sisteme de Operare. Aplicatii practice”, Editura Universității din Oradea, 2008, ISBN 978-973-759-624-6, nr. pag 198.
2. https://e.uoradea.ro/course/view.php?id=1941 Materials (courses and laboratories)</td></tr>
</table>

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline corresponds to the requirements necessary to acquire the concepts underlying the design and implementation of an operating system.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard: 50% of the subjects from the final exam should be correctly solved - For 10: 100% of the subjects from the final exam should be correctly solved	Semester exam – written	40%
10.5 Academic seminar	Minimum required conditions for passing the examination (grade 5): in accordance with the minimum performance standard - For 10:	-	-
10.6 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard: 50% of the problems from the final laboratory test should be correctly solved - For 10: 100% of the problems from the final laboratory test should be correctly solved	Oral/written	30%
10.7 Project	A practical application project covering one of the topics mentioned in the project list. Project evaluation: - compliance with the requirements of the chosen theme: 25% - installation, compilation and operation of the program: 25% - content of the report: 25% - verification of theoretical knowledge related to the realization of the project: 25%	Project Evaluations - oral presentations	30%
10.8 Minimum performance standard: Course: 50% of the maximum score of the final exam			

Academic seminar: Laboratory: 50% of the maximum score of the laboratory evaluations Project: 50% of the maximum score of the project evaluations

	Course instructor	Head of department
Completion date: 26.09.2023	prof. dr. ing. Győrödi Robert E-mail: rgyorodi@uoradea.ro	conf. dr. ing. Pater Mirela

Date of endorsement in the department:
27.09.2023

Date of endorsement in the Faculty Board:
29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	*Computers and Information Technology*
1.4 Field of study	*Computers and Information Technology*
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	*Computers & Information Technology /* Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject		*Computer Architecture II*					
2.2 Holder of the subject		Prof.dr.habil.eng. Daniela Elena Popescu					
2.3 Holder of the academic seminar/laboratory/project		**lect.dr.ing. Mircea-Petru Ursu**					
2.4 Year of study III		2.5 Semester 5		2.6 Type of the evaluation	7) Ex	2.7 Subject regime	8) DD

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	2/1
3.4 Total of hours from the curriculum	70	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	28/ 14

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	28
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	28
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	**28**
Tutorials	10
Examinations	4
Other activities.	

3.7 Total of hours for individual study	**98**
3.9 Total of hours per semester	**168**
3.10 Number of credits	**6**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions)
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	- The course can be held face to face or online " - attendance at least 50% of the courses
5.2.for the development of the academic seminary/laboratory/project	- The seminar / laboratory / project can be held face to face or online - Mandatory presence at all laboratories; - Students must have completed the theoretical part of the paper;

	- A maximum of 4 works can be recovered during the semester (30%); - The frequency at laboratory hours below 70% leads to the restoration of the discipline

6. Specific skills acquired	
Professional skills	CP3. Problem solving using Computer Science and engineering tools CP5. Design, life cycle management, integration and integrity of hardware, software and communications systems
Transversal skills	CT1. Applying, in the context of compliance with the law, intellectual property rights (including technology transfer), product certification methodology, principles, norms and values of the code of professional ethics within its own rigorous, efficient and responsible work strategy CT2. Identify roles and responsibilities in a multi-specialized team decision-making and assigning tasks, with the application of relationship techniques and efficient work within the team

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ The discipline aims to familiarize students with specialization with as much knowledge: theoretical and practical, related to the structure and operation of computer systems, so that students are able to understand the operation of modern systems, and the parallelism in their implementation.
7.2 Specific objectives	Course: ▪ Understanding arithmetic and logic operations. Classification of summation structures according to the mode of transport propagation ▪ Understanding Input, output, connection topologies. ▪ General information about computer networks, Network topologies, network standards, and network protocols ▪ Parallel computer architectures, Parallelism in systems with a central unit, Parallelism in systems with several central units, Classification of architectures, ▪ Understanding Parallelism in time (pipeline), Parallelism in Space (Processor Areas), Vector processing, ▪ Architectures based on the concept of data flow, Systolic architectures Laboratory & Project: ▪ Fixing the architecture, exterior interface signals, and instruction set for the processor project theme. Realization of the data processing unit at the level of the processor to be designed, Following the execution phase of the instruction for each instruction, Elaboration of the flowchart of the instruction cycle for the whole., Implementation of the control unit and the block of control circuits,, The project provides the necessary knowledge to the students in order to be able to design a minimum calculation system starting from some given specifications.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
Chapter 1. Central units and arithmetic-logic units, wired control and microprogrammed control. Particularities of information representation in computing systems. How to perform arithmetic and logic operations. Classification of summation structures according to the mode of transport propagation	• Free course presentation with video projector / overhead projector and blackboard in an interactive way: punctuate from time to time questions for students in order to increase the degree of interactivity	4
Chapter 2. Input, output, connection topologies. Bus communications. Protocols. Arbitrations. Methods of		4

communication with IO devices (Inputs-Outputs, Interrupts, DMA)	• Indication of topics for documentation and individual study	
Chapter 3. General information about computer networks, Network topologies and standards, HDLC protocol. ISO model of OSI architecture. ARPA Internet. Network topologies, standards and protocols		4
Chapter 4 Parallel computer architectures, Parallelism in systems with a central unit, Parallelism in systems with several central units, Classification of architectures		2
Chapter 5 Parallelism in time - The concept of pipeline, The organization of memory in structures with pipeline, Central units using pipeline. Arithmetic units with pipeline, Problems of these structures, Computers with BA		4
Chapter 6 Parallelism in Space - Processor Areas (PA). Characterization of PA, Types of Organizations, Associative PAs, Static and Dynamic Interconnection Networks, Problems Considered in PA Design, Multiple Processor Areas, Computers with PAs		2
Chapter 7 Vector processing, The typical structure of a vector computer, The concept of vector processing and assembly tape. Examples of vector processors.		2
Chapter 8 Architectures based on the concept of data flow., Graphical representation of programs, General structure of a system with data flow, Types of architectures with data flow, Static data structures and dynamic data structures, Disadvantages of the concept of data flow. data flow		2
Chapter 9 Systolic architectures, Characteristics of systolic architectures, Types of systolic structures, Tolerance to failures in systolic structures, Computers with systolic architecture. Algorithms / structures ratio		2

Bibliography

- Course notes (slides) made available to students in electronic format on the Office 365 platform, https://uoradea-my.sharepoint.com/personal/daniela_popescu_didactic_uoradea_ro/Documents/Forms/All.aspx
- William Stalings, Computer Organization and Architecture, 9th Edition, March 11, 2012 | ISBN-10: 013293633X | ISBN-13: 978-0132936330, Computer Science Series
- Course notes Architecture systems architecture, D.E.Popescu, posted on the Office platform for CTI students
- Popescu Daniela E .. - Architecture and organization of conventional computer systems ,, University of Oradea Publishing House, Oradea, 2002, ISBN 973-613-225-0, 2002
- D.E.Popescu, C.Popescu, Architecture of computer systems, University Publishing House, laboratory supervisor, ISBN 973-613-225-9, 2002
- Popescu Daniela E., Introduction to the architecture of computer systems, MATRIX ROM publishing house Bucharest, ISBN 973 - 685-067 –6
- K.Hwang, F.A. Briggs - Computer Architecture and Parallel processing, Treira Publishing House, Mc Graw - Hill Book company 1987

- Mircea Popa, Introductions in parallel and unconventional architectures, AS Computer Press Publishing House Timişoara 1992

8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
1. Presentation of the laboratory, of the labor protection norms and of the problems specific to the field of computer systems - generalities regarding the architecture of computer systems.	Students receive (via the Internet) the laboratory papers at least one week in advance and study them. Then, the students carry out the practical part of the work under the guidance of the teacher. The tools used are: ALTERA Quartus II Web Edition - integrated environment for the development and simulation of digital circuits ALTERA DE1 - Configurable test board, designed for teaching purposes (FPGA programming)	2
2. A computing system based on the NIOS II processor.		2
3. Input / output ports (part one).		2
4. Input / output ports (part two).		2
5. Interrogation.		2
6. Interruption.		2
7. Assessment of knowledge. Test 1.		2
8. Multiprocessor systems.		2
9. Using the audio port.		2
10. Using the video port (part one).		2
11. Using the video port (part one).		2
12. Audio-video application.		2
13. Assessment of knowledge. Test 2.		2
14. Laboratory recoveries. Ending the situation.		2

Bibliography

1. Course notes (slides) made available to students in electronic format on the Office 365 platform, https://uoradea-my.sharepoint.com/personal/daniela_popescu_didactic_uoradea_ro/Documents/Forms/All.aspx
2. D.E.Popescu, C.Popescu, Architecture of computer systems, University Publishing House, laboratory supervisor, ISBN 973-613-225-9, 2002
3. Office 365 platform on which the laboratory works are loaded
4. Laboratory guide Computer systems architecture, Daniel Filipaș
5. Architecture and organization of conventional computing systems - laboratory works guide, revised edition,, University of Oradea Publishing House, ISBN: 978-606-10-0678-6

8.3 Academic project	Teaching methods	No. of hours/ Observations
1. Design of a microprogrammed system based on the NIOS II processor, starting from some given specifications.		
Design steps: 1. Presentation of project themes. Each student receives a homework assignment. 2. - 6. Realization of the system using the components of Quartus II Web Edition, writing programs to run on this system and fulfilling the requirements of the project theme, testing the system / programs with the Altera DE1 board, questions and answers related to the problems encountered, preparation of project documentation. 7. Project support, practical verification of operation and grading.	Students receive the design theme and design methodology and complete the project stages under the guidance of the teacher. The tools used are: ALTERA Quartus II Web Edition - integrated environment for the development and simulation of digital circuits ALTERA DE1 - Configurable test board, designed for teaching purposes (FPGA programming).	2 hours are allocated for each of the 7 detailed points of the laboratory activity.

Bibliography

1. ALTERA Quartus II Web Edition
2. Annexes of the laboratory supervisor - Daniel Filipaș Laboratory supervisor Computer systems architecture, Daniel Filipaș

3. Architecture and organization of conventional computing systems - laboratory works guide, revised edition,, University of Oradea Publishing House, ISBN: 978-606-10-0678-6

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline is found in the curriculum of Computer and Information Technology specializations and other university centers that have accredited these specializations (Technical University of Cluj-Napoca, University of Craiova, "Politehnica" University of Timisoara, Gh. Asachi University of Iasi, etc.), and knowledge of the architecture and organization of computer systems as well as their operation and design is a stringent requirement of employers in the field (Rds & Rcs, Plexus, Neologic, Celestica, Keysys, etc.).

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5) in accordance with the minimum performance standard: - it is necessary to know the fundamental notions required in the subjects, without presenting details on them For 10: - for grade 10, a thorough knowledge of all is required	The evaluation can be done face to face or online depending on the situation imposed	70%
10.6 Laboratory	- for mark 5 it is necessary to solve the corresponding number of requirements, depending on the test scale. - for mark 10, all requirements on the test sheet must be correctly resolved.	Tests during the semester The evaluation of students is done through two tests, taken during the semester. The arithmetic mean of the marks of these tests represents the mark with which they enter the exam. Students can also get extra points, depending on their participation in the laboratory and solving exercises with a higher degree of difficulty. These points can be used to calculate the test score.	30%
10.7 Project	- for mark 6, going through the design stages, without going into the design details.	Oral presentation Following the presentation of the project completed during	100%

	- for mark 10, going through all the design stages, with the completion of the elaboration of the project theme.	the semester, each student receives a grade, separate from the exam.	

10.8 Minimum performance standard:
Assimilation of detailed knowledge about the construction, operation and design of central processing units for digital computers, as well as about the organization of different types of memories associated with them. The studied design methods are exemplified on existing architectures, including the study of special architectures. A VHDL processor for the FPGA will be designed.
The term solution, in individual activities and activities carried out in groups, in conditions of qualified assistance, of the problems that require the application of principles and rules respecting the norms of professional deontology.
Responsible assumption of specific tasks in multi-specialized teams and efficient communication at institutional level.
Development of team spirit, spirit of mutual help, awareness of the importance of training during the semester for good and sustainable results, awareness of the importance of research, own research related to learning (library, internet), cultivating a discipline of work, done correctly and on time

Completion date:
25.09.2023

Date of endorsement in the department:
27.09.2023

Date of endorsement in the Faculty Board:

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Computers and Information Technology**
1.4 Field of study	**Computers and Information Technology**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Computers / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject			Computer Aided Design (CAD)				
2.2 Holder of the subject			Șef lucrări.dr.ing. Mihăilă Ioan Mircea				
2.3 Holder of the academic seminar/laboratory/project			Șef lucrări.dr.ing. Mihăilă Ioan Mircea				
2.4 Year of study	III	2.5 Semester	II	2.6 Type of the evaluation	VP	2.7 Subject regime	FD

FD – Field Discipline

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 project	0	3.4 laboratory	2
3.5 Total of hours from the curriculum	56	of which: 3.6 course	28	3.7 project	0	3.8 laboratory	28
Distribution of time							70
Study using the manual, course support, bibliography and handwritten notes							42
Supplementary documentation using the library, on field-related electronic platforms and in field-related places							8
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays							14
Tutorials							2
Examinations							4
Other activities.							

3.9 Total of hours for individual study	**70**		
3.10 Total of hours per semester	**140**		
3.11 Number of credits	**5**		

4. Pre-requisites (where applicable)

4.1 related to the curriculum	Electronics. Electrical Engineering. Measuring Devices.
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	Classroom equipped with video projector and computer. The course can be held face to face or online.
5.2.for the development of the academic seminary/laboratory/project	Laboratory equipped with computers that are connected to the Internet and dedicated software installed. The laboratory / project can be held face to face or online

6. Competenţele specifice acumulate	
Professional skills	CP1. Operating with scientific, engineering and informational fundaments CP3. Solving problems using computer science and engineering instruments CP2. Hardware, software, telecommunication
Transversal skills	CT2. Identifying, describing and carrying out the processes in project management, taking over the different roles in the team and clearly and concisely describing, verbally and in writing, the results in the field of activity.

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ The course aims to present to the students how to use ORCAD to realize, modify, test and simulate electronic circuits.
7.2 Specific objectives	• The course and the laboratory aim to introduce and familiarize students with problems related to the hardware design. • Laboratory: drawing electrical circuits, modifying circuits, simulation, preparation for the physical implementation of circuits.

8. Contents

8.1 Course	Teaching methods	No. of hours / observations
Cap. 1. Introduction General data regarding CAD	Oral presentation using the video projector, debates, questions and answers.	
Cap. 2. Drawing and processing electrical diagrams using CAD 2.1. OrCAD Capture 2.2. Projects, circuits, libraries 2.3. Macros 2.4. Organizing electrical circuits 2.5. Creating and editing components 2.6. Processing tools		
Cap. 3. Simulating electrical circuits 3.1 Pspice A/D 3.2 Preparation for simulation 3.3 Logical simulation		
Cap. 4. Wiring diagram. Drilling masks, Implementation diagram 4.1. Rules for wiring diagrams 4.2. The technology of designing and manufacturing electronic boards 4.3. Preparing a project for physical implementation 4.4 PCB Editor		

<table>
<tr><td colspan="3">Bibliography:
OrCAD 17.2 Tuturial
A.Câmpeanu - ORCAD, Ed.TEORA, 1994
D.Pitică şi alţii - ORCAD IV Proiectarea plachetelor electronice, Microinformatica 1997
D. Maştei – Proiectarea asistată de calculator, Ed. Universităţii 1999
D. Maştei – Proiectare asistată de calculator, Ed. Departamentului I.D., 2003
Cadence 16.5 Tutorial
Kraig Mitzner-Complete PCB Design Using OrCad Capture and Layout, 2010,2014, Elsevier Inc
VOLOSCIUC, SORIN DAN. Proiectarea şi realizarea modulelor electronice – Sibiu, 2019
https://resources.pcb.cadence.com/orcad-capture-tutorials www.cetti.ro – Iniţiere in realizarea practică a schemelor electronice https://uoradea.sharepoint.com/:f:/s/PAC-semI2022-2023/Ej1H-dfHNNBCovvCtRkixq4BeLEFwnt8JvH_29GHLgSJiw?e=M</td></tr>
<tr><td>8.2 Laboratory</td><td>Teaching methods</td><td>Observatios</td></tr>
<tr><td>OrCAD menu
Libraries. Placing a component in the circuit. Connecting components
Creating and editing a component. Macros
Assigning references
Simple electrical circuits
Organizing complex circuits. Flat and hierarchical circuit diagrams
Libraries. Adding a new part to an existing or to a new library
SMC-PCB transfer techniques.</td><td rowspan="2">PowerPoint presentation using the video projector
Students use a OrCAD Capture and PSpice to draw, modify and simulate electric circuits.</td><td rowspan="2">2-4 hours are allocated for each laboratory activity</td></tr>
<tr><td>Final test</td></tr>
<tr><td colspan="3">Bibliography
E. Vladu, C. Berce, "Interfeţe şi echipamente perfiferice. Aplicaţii.", Ed. Univ. din Oradea 2002;
Scott Mueller şi Craig Zacker "PC depanare şi modernizare" Editura Teora 2000
Jean Andrews- CompTIA A+ Guide to Hardware Managing, Maintaining and Troubleshooting 2014, Cengage Learning</td></tr>
</table>

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

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The content of the discipline is found in the curriculum of Computer and Information Technology specializations from another Universities that have accredited these specializations, and knowledge related to electrical circuits and CAD.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.1 Course	For mark 5 it is necessary to know the fundamental notions required in the subjects, without presenting details on them For mark 10, a thorough knowledge of all subjects is required	Written paper The evaluation can be done face to face or online	70 %
10.2 Laboratory	For mark 5: correct answer to at least 40% of the questions For mark 10: correct answer to all questions	Laboratory / practical works Tests during the semester The evaluation can be done face to face or online	30%
10.4 Minimum performance standard:			
Assimilation of detailed knowledge about electrical circuits and CAD In time solution for individual or in group activities, with qualified assistance. Development of team spirit, spirit of mutual help, awareness of the importance of training during the semester for good			

and sustainable results, awareness of the importance of research, and learning (library, internet).

Date of filling in:
26.09.2023

Date of endorsement in the department
27.09.2023

Date of endorsement in the Faculty’s Board
29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Computers and Information Technology**
1.4 Field of study	**Computers and Information Technology**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Computers / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject		**Design with microprocessors**					
2.2 Holder of the subject		Lect. dr. ing. Poszet Otto					
2.3 Holder of the academic seminar/laboratory/project		Lect. dr. ing. Poszet Otto					
2.4 Year of study	3	2.5 Semester	2	2.6 Type of the evaluation	Ex.	2.7 Subject regime	DD

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	0/1/1
3.4 Total of hours from the curriculum	56	of which: 3.5 course	28	3.6 academic seminar/laboratory/project	0/14/14

Distribution of time	hours
Study using the manual, course support, bibliography, and handwritten notes	14
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	6
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	20
Tutorials	2
Examinations	2
Other activities.	

3.7 Total of hours for individual study	44
3.9 Total of hours per semester	100
3.10 Number of credits	4

4. Pre-requisites (where applicable)

4.1 related to the curriculum	Microprocessor systems
4.2 related to skills	Digital electronics II

5. Conditions (where applicable)

5.1. for the development of the course	The course can be conducted face to face with a projector or online.
5.2.for the development of the academic seminary/laboratory/project	The laboratory/project can be carried out face to face or online, requiring personal computers, PIC microcontroller development kit, AVR Butterfly, Arduino module or Raspberry Pi.

6. Specific skills acquired

Professional skills	▪ Design of hardware, software and communications components ▪ Design, life cycle management, integration and integrity of hardware, software and communication systems ▪ Maintenance and operation of hardware, software and communication systems ▪ Elaboration of a microsystem project through computer-aided design ▪ Programming the interface circuits ▪ Working with the technique of interrupts in a microsystem ▪ Programming a microcontroller ▪ Development of a microcontroller system
Transversal skills	▪ Honorable, responsible, ethical behavior, in the spirit of the law to ensure the reputation of the profession ▪ Clear and concise written description of the results in the field of activity, including by consulting documentation in a language of international circulation ▪ Demonstrating the spirit of initiative and action to update professional knowledge

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ Knowledge of the principles of designing modules for multimicroprocessor systems, assembly language programming and development of microcontroller systems
7.2 Specific objectives	▪ Knowledge of the principles of designing a multiprocessor system ▪ Understanding the operation of the interface block with the multiprocessor bus ▪ Knowledge of the architecture and components of a personal computer ▪ Knowledge of advanced microprocessor facilities ▪ Understanding how to develop a microcontroller application program ▪ Understanding the architecture and how to use a microcontroller

8. Contents

8.1 Course	Teaching methods	No. of hours/ Observations
Multiprocessor bus	Lecture	2
Design of modules for multimicroprocessor systems	Lecture	2
Personal computers. Processors and memories	Lecture	2
Personal computers. Buses and interfaces	Lecture	2
Advanced processors	Lecture	2
Microcontrollers. PIC microcontroller family	Lecture	2
PIC architecture 16/18/24. Instruction set	Lecture	2
Power, clock, reset, instruction cycle	Lecture	2
Parallel ports	Lecture	2
Interrupts	Lecture	2
Timing	Lecture	2
Asynchronous serial I/O	Lecture	2
Synchronous serial I/O. I2C bus	Lecture	2
Data acquisitions and conversions	Lecture	2

Bibliography

1. Vari K. Ştefan: Microprocesoare şi microcalculatoare, Editura Universităţii din Oradea, ISBN 973-613-235-8, 2002.
2. Poszet O, Beuca M, Bumba M, Costea N, Madar D, Sferle R, Proiectare cu microprocesoare, Îndrumător de laborator, 2020 (format electronic), https://uoradea-my.sharepoint.com/personal/otto_poszet_didactic_uoradea_ro/_layouts/15/onedrive.aspx
3. S. Mueller, PC Repair and Upgrading, Que Publishing, 2015.
4. R. B. Reese, J. W. Bruce, Microcontrollers: from Assembly Language to C Using the PIC24 Family, Cengage Learning PTR, 2014.
5. T. Wilmshurst, Designing Embedded Systems with PIC Microcontrollers, Newnes, 2009.

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7. B. B. Brey, The Intel Microprocesors. Architecture, Programming and Interfacing, Prentice Hall, 8th Edition, ISBN 978-8131726228., 2011.
8. Walter Triebel, Avtar Singh, 8088 and 8086 Microprocessors : Programming, Interfacing, Software, Hardware, and Applications - 4th edition, ISBN13: 9780130452313, ISBN10: 0130452319, Publisher: Prentice Hall, Inc., Published: 2003
9. F. Dragomir, O. E. Dragomir, Programarea în limbaj de asamblare a microcontrolerelor, Matrix Rom, 2013.
10. Frederick M Cady, Microcontrollers and Microcomputers: Principles of Software and Hardware Engineering, Cady, F., Oxford University Press, 2010.
11. Michael Margolis, Arduino Cookbook: Recipes to Begin, Expand, and Enhance Your Projects Paperback Illustrated, O'Reilly Media, 25 Jan. 2016, ISBN10:149190352X

8.1 Laboratory	Teaching methods	No. of hours/ Observations
Presentation of the works and the development environment	Debate, measurements, processing of results	2
Microcontroller programming techniques	Debate, measurements, processing of results	2
Connecting and controlling the LEDs	Debate, measurements, processing of results	2
Connecting and controlling displays	Debate, measurements, processing of results	2
Connecting and controlling the keyboard	Debate, measurements, processing of results	2
Using the A/D converter	Debate, measurements, processing of results	2
Evaluation of laboratory activity	Presentation of reports, questions	2
8.2 Project	Teaching methods	No. of hours/ Observations
Defining the design theme	Debate, exemplification, individual and group work, verification and discussions	2
Study of the module with microcontroller. Development of the block diagram of the application	Debate, exemplification, individual and group work, verification and discussions	2

Elaboration of the hardware electrical scheme	Debate, exemplification, individual and group work, verification and discussions	2
Interface design	Debate, exemplification, individual and group work, verification and discussions	2
Development of application programs	Debate, exemplification, individual and group work, verification and discussions	2
Elaboration of documentation	Debate, exemplification, individual and group work, verification and discussions	2
Project evaluation	Defense, questions	2

Bibliography

1. Vari Kakas Șt., Sisteme cu microprocesoare (îndrumător de laborator), Universitatea din Oradea, 2002.
2. Poszet O, Beuca M, Bumba M, Costea N, Madar D, Sferle R, Proiectare cu microprocesoare, Îndrumător de laborator, 2020 (format electronic), https://uoradea-my.sharepoint.com/personal/otto_poszet_didactic_uoradea_ro/_layouts/15/onedrive.aspx
3. F. Dragomir, O. E. Dragomir, Programarea în limbaj de asamblare a microcontrolerelor, Matrix Rom, 2013.
4. Microchip, PICDEM Lab Development Board. User's Guide, 2009.
5. Vari Kakas Șt., Sisteme cu microprocesoare (îndrumător de proiect), Universitatea din Oradea, 2004.
6. Arduino Home, https://www.arduino.cc/

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The discipline provides theoretical and practical knowledge directly applicable in the computer industry and in the field of information technology services.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard	Written exam.	70%
10.5 Academic seminar			
10.6 Laboratory	Minimum required conditions for promotion	Reports presentation. Questions.	Condition + 10%

	(grade 5): in accordance with the minimum performance standard		
10.7 Project	Practical project.	Application presentation. Defense.	Condition + 20%
10.8 Minimum performance standard: Course: Pass mark from 50% of the requirements met. Academic seminar: Laboratory: Pass. Project: Pass.			

Completion date:
25.09.2023

Signature of the course owner

Lect. Dr. Ing. Otto Poszet
.....

Signature of the seminar/ laboratory/project owner
Lect. Dr. Ing. Otto Poszet
.....

Date of endorsement in the department:
27.09.2023

Signature of Department Director
Conf. Dr. Ing. Alexandrina Mirela Pater
.....

Date of endorsement in the Faculty Board:
29.09.2023

Signature of Dean
Prof. Dr. Ing. Habil. Francisc Ioan Hathazi
.....

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	Computers and Information Technology
1.4 Field of study	Computers and Information Technology
1.5 Study cycle	Bachelor
1.6 Study program/Qualification	Computers / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject		**Functional Programming**					
2.2 Holder of the subject		s.l.dr.inf. Costea Felicia Mirabela					
2.3 Holder of the academic seminar/laboratory/project		s.l.dr.inf. Costea Felicia Mirabela					
2.4 Year of study	**III**	2.5 Semester	**V**	2.6 Type of the evaluation	**Ex.**	2.7 Subject regime	**DD**

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**3**	of which: 3.2 course	**2**	3.3 academic seminar/laboratory/project	**1**
3.4 Total of hours from the curriculum	**42**	Of which: 3.5 course	**28**	3.6 academic seminar/laboratory/project	**14**
Distribution of time					hours
Study using the manual, course support, bibliography and handwritten notes					10
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					8
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					11
Tutorials					
Examinations					3
Other activities.					

3.7 Total of hours for individual study	**33**
3.9 Total of hours per semester	**75**
3.10 Number of credits	**3**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	
4.2 related to skills	Knowledge of the fundamental aspects of algorithms. Recursion

5. Conditions (where applicable)

5.1. for the development of the course	The course can be conducted face-to-face or online. The course takes place with the modern techniques available: Laptop, Video projector, Blackboard or on specialized platforms for online courses (e.uoradea.ro, Microsoft Teams).
5.2.for the development of the academic	- laboratory room equipped with computers: Wordpress, WP plugin, PrestaShop

seminary/laboratory/project	The lab can be conducted face-to-face or online. Laboratory work is carried out using the modern tools available in the laboratory: Personal computers, specific software programs. Mandatory attendance at all laboratories 1 laboratory work can be recovered during the semester

6. Specific skills acquired	
Professional skills	C2 - Design of hardware, software and communication components C2.1 - Description of the structure and operation of the hardware, software and communication components C2.2 - Explaining the role, interaction and functioning of hardware, software and communication system components C2.3 - Building hardware, software and communication components using design methods, languages, algorithms, data structures, protocols and technologies C2.4 - Evaluation of functional and non-functional characteristics of hardware, software and communication components, based on some metrics C2.5 - Implementation of hardware, software and communication components
Transversal skills	- Honorable, responsible, ethical behavior in the spirit of the law to ensure the reputation of the profession - The clear and concise description in writing, in Romanian, of the results in the field of activity - Demonstrating the spirit of initiative and action to update professional knowledge

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	The main goal is to familiarize students with code development techniques that minimize the risk of introducing programming errors. Accumulation is desired a set of knowledge on increasing the ability to write code correctly.
7.2 Specific objectives	- Learning to apply recursion to eliminate state variables - Learning to prove the correctness of a program - Learning to identify the advantages and disadvantages of different programming styles.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations

Bibliography

1. Mihai Gontineac, Programare funcționala - O introducere utilizând limbajul Haskell, Ed. Al MyllerIasi, 2006
2. Graham Huton, Programming in Haskell, http://www.cs.nott.ac.uk/~gmh/
3. Richard Bird, Introduction to Functional Programming using Haskell, Prentice Hall, 1998.
4. I.A. Leţia, Programare funcţională, Ed. UTPres, UTCN, 1996.
5. I.A. Leţia, L.A. Negrescu, L. Negrescu, Programare funcţională, vol. I, Ed. Albastră, 2006.
6. C. Muscalagiu - Introducere in programarea logica si limbajele de programare logica, Ed. Univ. "A.I.Cuza" Iasi, 1996
7. Limbajul Haskell: http://www.haskell.org/haskellwiki/Haskell
8. David Mertz – Functional programming in Python, O'Reilly Media, 2015
9. H. Abelson, G. J. Sussman, J. Sussman - Structure and Interpretation of Computer Programs, Secon edition, MIT Press, 1996
10. St. Trausanu-Matu - Programare in LISP. Inteligenta artificiala si web semantic, Ed. POLIROM, 2004
11. Albert Sweigart - Invent Your Own Computer Games with Python, Creative Commons, 2009
12. http://myri1.ieat.ro/plf/
13. http://www.haskell.org/haskellwiki/Haskell_in_education
14. https://www.python.org/
15. https://www.codecademy.com/language/python

8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
1. Haskell functions. Recursion. 2. Internal representation, evaluation control, function definitions. Recursion and iteration. 3. LAMBDA expressions 4. Higher order functions, mapping. 5. Lists. Working with lists 6. Pattern matching. Symbolic processing. 7. Haskell higher-order functions 8. Lazy rating. (Haskell) 9. Python Functions, Lambda Expressions, Class Instances 10. Operations on lists. 11. Operations on trees, graphs. 12. Lazy Evaluation (Python) 13. Higher-order Python functions 14. Laboratory test (Programming in Haskell, Python).	experimental study, programming, debate. Written test	1h 1h 1h 1h 1h 1h 1h 1h 1h 1h 1h 1h 1h 1h 1h 1h

Bibliography

1. REEDE C., Elements of Functional Programming, Addison Wesley, New York, 1989.
2. WINSTON P.H., Artificial Intelligence, Addison Wesley, New York, 2nd edition, 1984
3. David Mertz – Functional programming in Python, O'Reilly Media, 2015
4. Richard Bird and Philip Wadler. Introduction to Functional Programming, Prentice Hall International, 1988
5. Paul Hudak and Joseph H. Fasel. \A Gentle Introduction to Haskell", Acmsigplan Notices, Vol. 27, No. 5, May 1992
6. Oprea M., Programare logică şi funcţională, notiţe de curs, UPG Ploieşti, 2013-2014.
7. Rance D. Necaise - Data Structures and Algorithms Using Python, Library of Congress Cataloging-in-Publication Data, 2011
8. http://www.haskell.org/haskellwiki/Tutorials
9. http://www.haskell.org/haskellwiki/GHC
10. http://www.haskell.org/ghc/
11. https://www.python.org/
12. https://www.codecademy.com/language/python

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The discipline offers theoretical and practical knowledge directly applicable in the computer industry and in the field of information technology services. In support of the business objectives of IT companies to develop robust software products and minimize errors, this course focuses on the correctness of program development. The course presents formal methods based on the principle of mathematical induction for checking the correctness of programs. The content of the subject is consistent with similar courses of other universities in the country

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Understanding the concepts specific to the functional programming paradigm. The ability to demonstrate the correctness of programs	**The assessment can be done face to face or online.** **Written or online exam.**	70%
10.5 Academic seminar			
10.6 Laboratory	Ability to develop code. Ability to identify and correct programming errors. Compliance with deadlines.	Written test	30%
10.7 Project			
10.8 Minimum performance standard: Course: Basic theoretical and practical knowledge in creating a website Academic seminar: Laboratory: Basic theoretical and practical knowledge in creating a website Project:			

Completion date: 15.09.2023

Course instructor
Ș.l. dr. inf. Costea Felicia Mirabela
E-mail: mira_costea@uoradea.ro

Head of department
Conf. dr. ing. Pater Mirela

Date of endorsement in the department: 27.09.2023

Dean: Prof.dr.ing.habil. Francisc Hathaz

Date of endorsement in the Faculty Board: 29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Computers and Information Technology**
1.4 Field of study	**Computers and Information Technology**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Computers / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject				Input / Output Systems and Data Transmission			
2.2 Holder of the subject				Șef lucrări.dr.ing. Mihăilă Ioan Mircea			
2.3 Holder of the academic seminar/laboratory/project				Șef lucrări.dr.ing. Mihăilă Ioan Mircea			
2.4 Year of study	III	2.5 Semester	II	2.6 Type of the evaluation	EX	2.7 Subject regime	FD

FD – Field Discipline

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	5	of which: 3.2 course	2	3.3 project	1	3.4 laboratory	2
3.5 Total of hours from the curriculum	70	of which: 3.6 course	28	3.7 project	14	3.8 laboratory	28

Distribution of time	70
Study using the manual, course support, bibliography and handwritten notes	42
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	8
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	14
Tutorials	2
Examinations	4
Other activities.	

3.9 Total of hours for individual study	**70**		
3.10 Total of hours per semester	**140**		
3.11 Number of credits	**5**		

4. Pre-requisites (where applicable)

4.1 related to the curriculum	Computers architecture. Systems with microprocessors. Networking.
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	Classroom equipped with video projector and computer. The course can be held face to face or online.
5.2.for the development of the academic seminary/laboratory/project	Laboratory equipped with computers that are connected to the Internet and dedicated software installed. The laboratory / project can be held face to face or online

6. Competențele specifice acumulate	
Professional skills	CP1. Operating with scientific, engineering and informational fundaments CP3. Solving problems using computer science and engineering instruments CP2. Hardware, software, telecommunication
Transversal skills	CT2. Identifying, describing and carrying out the processes in project management, taking over the different roles in the team and clearly and concisely describing, verbally and in writing, the results in the field of activity.

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ The course aims to present to the students how are designed and how work the Input / Output systems
7.2 Specific objectives	• The course and the laboratory aim to introduce and familiarize students with problems related to the input-output system of a computer, the interface with peripheral equipment and the operating principles of peripheral equipment, presenting modern technologies, implementation, examples and applications

8. Contents

8.1 Course	Teaching methods	No. of hours / observations
Introduction General data regarding the I / O system. I / O systems. I / O modules	Oral presentation using the video projector, debates, questions and answers.	2 hours
Data transfer methods Scheduled transfer. Reading data. Writing data. I / O commands. I / O instructions Interrupt transfer Direct memory access (DMA) transfer		2 hours
Buses The concept of bus. Defining elements Classification of buses by working mode Classification of buses by number of connected master modules Classification of buses according to the way of data transfer Classification of buses according to the number of signals used in data transfer PCI bus PCIe bus USB bus		8 hours
Video peripherals General presentation. Types of displays. Features and performance. Video adapter. Graphic controller. Video BIOS system. Video memory		6 hours

Liquid crystal displays OLED displays		
Data magnetic recording General presentation. The structure of a hard disk Principles of data magnetic recording Organizing data on the hard disk. Interface		2 hours
Data storage on optical discs. CD. DVD. Blu-Ray		2 hours
Printing technologies Printers classification. Printer's general structure Dot matrix printer. Inkjet printers. Laser printer Color printer		4 hours
Remote data transmission. Network card (RJ45 connection, Wi-Fi wireless connection) Router Components of a computer network.		2 hours

Bibliography:

E. Vladu "Interfeţe şi echipamente periferice" , Ed. Univ. din Oradea 2002;
James W. Coffron, Wiliam E. "Long Practical Interfacing Techniques for Microprocessor" 2000,
Prentice Hall Inc.; Andrew Tanenbaum,
Organizarea structurata a calculatoarelor, Computer Press Agora, Bucuresti, 1999.;
IBM PC/AT Tehnical Reference. IBM Personal Computer Hardware Reference Library 2005;
C. Strugaru -Calculatoare Sistemul de intrare-ieşire, Ed. Orizonturi universitare, Timişoara 2001
Baruch Zoltan – note de curs http://users.utcluj.ro/~baruch/ro/pages/cursuri/sisteme-de-intrareiesire/curs.php, 2015
Baruch Zoltan., Sisteme de intrare/ieşire, Îndrumător de lucrări de laborator, Editura U.T.PRES, Cluj-Napoca, 1998.
Petre Lucian Orgutan – Tehnici de Interfatare - Curs
WEB sources
https://en.wikipedia.org/wiki/Bus_(computing)
https://www.explainthatstuff.com/how-oleds-and-leps-work.html
https://ramonnastase.ro/blog/retele-de-calculatoare-ghid-complet-de-introducere-in-retele-de-calculatoare/
https://ro.wikipedia.org/wiki/Ruter
https://ro.wikipedia.org/wiki/Plac%C4%83_de_re%C8%9Bea

8.2 Laboratory	Teaching methods	Observatios
Data transfer methods, Parallel port, Serial port, USB interface PC interrupts, Magnetic and compact discs - interface solutions Peripheral equipment - printers, monitors Network card installation / configuration. Router installation / configuration	PowerPoint presentation using the video projector Students use a programming language to check how various interfaces work. The programs are verified along the semester.	2-4 hours are allocated for each laboratory activity
Final test		

8.3 Academic projects	Teaching methods	Observatios
Input / Output systems. Peripheral equipment. Data transmission,	Applications based on courses and laboratories	14 hours

Bibliography
E. Vladu, C. Berce, "Interfeţe şi echipamente perfiferice. Aplicaţii.", Ed. Univ. din Oradea 2002;
Scott Mueller şi Craig Zacker "PC depanare şi modernizare" Editura Teora 2000
Jean Andrews- CompTIA A+ Guide to Hardware Managing, Maintaining and Troubleshooting 2014, Cengage Learning

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

-

The content of the discipline is found in the curriculum of Computer and Information Technology specializations from another Universities that have accredited these specializations, and knowledge related to I / O system and peripheral equipment, are elements of interest to employers.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.1 Course	For mark 5 it is necessary to know the fundamental notions required in the subjects, without presenting details on them For mark 10, a thorough knowledge of all subjects is required	Written paper The evaluation can be done face to face or online	50 %
10.2 Laboratory	For mark 5: correct answer to at least 40% of the questions For mark 10: correct answer to all questions	Laboratory / practical works Tests during the semester The evaluation can be done face to face or online	20%
10.3 Proiect	Oral presentation, followed by a practical demonstration. For mark 6: completed project submitted in written form. For mark 10: completed project submitted in written form, correct answer to all questions, functional practical demonstration.	The evaluation can be done face to face or online	30%
10.4 Minimum performance standard:			
Assimilation of detailed knowledge about interfacing peripherals in computer systems In time solution for individual or in group activities, with qualified assistance. Development of team spirit, spirit of mutual help, awareness of the importance of training during the semester for good and sustainable results, awareness of the importance of research, and learning (library, internet).			

Date of filling in:
26.09.2023

Date of endorsement in the department
27.09.2023

Date of endorsement in the Faculty’s Board
29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Computers and Information Technology**
1.4 Field of study	**Computers and Information Technology**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Computers / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject		**Microprocessor systems**					
2.2 Holder of the subject		lect. dr. ing. Poszet Otto					
2.3 Holder of the academic seminar/laboratory/project		lect. dr. ing. Poszet Otto					
2.4 Year of study	3	2.5 Semester	1	2.6 Type of the evaluation	Ex.	2.7 Subject regime	SD

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	0/2/0
3.4 Total of hours from the curriculum	56	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	0/28/0

Distribution of time	hours
Study using the manual, course support, bibliography, and handwritten notes	22
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	4
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	14
Tutorials	2
Examinations	2
Other activities.	

3.7 Total of hours for individual study	44
3.9 Total of hours per semester	100
3.10 Number of credits	4

4. Pre-requisites (where applicable)

4.1 related to the curriculum	
4.2 related to skills	Digital electronics I

5. Conditions (where applicable)

5.1. for the development of the course	The course can be conducted face to face with a projector or online.
5.2.for the development of the academic seminary/laboratory/project	The laboratory can be carried out face to face or online,

6. Specific skills acquired

Professional skills	▪ Design of hardware, software and communications components ▪ Design, life cycle management, integration and integrity of hardware, software and communication systems ▪ Maintenance and operation of hardware, software and communication systems ▪ Designing a memory block ▪ Design of an input/output interface ▪ Operation of a microsystem through the monitor program ▪ Working and troubleshooting the microsystem at machine code level ▪ Performing measurements with the oscilloscope in a microprocessor system ▪ Measuring the parameters of the memory circuits
Transversal skills	▪ Honorable, responsible, ethical behavior, in the spirit of the law to ensure the reputation of the profession ▪ Clear and concise written description of the results in the field of activity ▪ Demonstrating the spirit of initiative and action to update professional knowledge

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ Introduction and familiarization of students with the technique of designing microprocessor systems
7.2 Specific objectives	▪ Knowledge of the component parts of a microprocessor system ▪ Knowledge of the structural elements of a microprocessor ▪ Knowledge of the components needed to connect the microprocessor to the system ▪ Understanding how a bus works ▪ Knowing how to select memory circuits ▪ Knowledge of the types of memory circuits ▪ Understanding the types of inbound and outbound operations ▪ Knowledge of interface circuits

8. Contents

8.1 Course	Teaching methods	No. of hours/ Observations
Introduction	Lecture	2
Internal data representation	Lecture	2
Representation of instructions and data in memory	Lecture	2
Central processing unit	Lecture	2
Microprocessor operation	Lecture	2
Microprocessor connections to the system	Lecture	2
Main memory	Lecture	2
Types of memory circuits and their use in microsystems	Lecture	2
Programmed transfer	Lecture	2
Interrupt transfer	Lecture	2
Typical parallel interfaces	Lecture	2
Serial interfaces	Lecture	2
Direct memory access (DMA)	Lecture	2
Timing circuits	Lecture	2

Bibliography

1. Vari K. Ştefan: Microprocesoare şi microcalculatoare, Editura Universităţii din Oradea, ISBN 973-613-235-8, 2002.
2. Poszet O, Beuca M, Bumba M, Costea N, Madar D, Sferle R, Proiectare cu microprocesoare, Îndrumător de laborator, 2020 (format electronic), https://uoradea-my.sharepoint.com/personal/otto_poszet_didactic_uoradea_ro/_layouts/15/onedrive.aspx

3. B. B. Brey, The Intel Microprocesors. Architecture, Programming and Interfacing, Prentice Hall, 8th Edition, ISBN 978-8131726228, 2011.
4. S. Mueller, PC Repair and Upgrading, Que Publishing, 2015.
5. R. B. Reese, J. W. Bruce, Microcontrollers: from Assembly Language to C Using the PIC24 Family, Cengage Learning PTR, 2014.
6. T. Wilmshurst, Designing Embedded Systems with PIC Microcontrollers, Newnes, 2009.
7. M. A. Mazidi, D. Causey, R. McKinlay, PIC Microcontroller and Embedded Systems, MicroDigitalEd, 2016
8. Walter Triebel, Avtar Singh, 8088 and 8086 Microprocessors : Programming, Interfacing, Software, Hardware, and Applications - 4th edition, ISBN13: 9780130452313, ISBN10: 0130452319, Publisher: Prentice Hall, Inc., Published: 2003
9. F. Dragomir, O. E. Dragomir, Programarea în limbaj de asamblare a microcontrolerelor, Matrix Rom, 2013.
10. Frederick M Cady, Microcontrollers and Microcomputers: Principles of Software and Hardware Engineering, Cady, F., Oxford University Press, 2010.
11. Michael Margolis, Arduino Cookbook: Recipes to Begin, Expand, and Enhance Your Projects Paperback – Illustrated, O'Reilly Media, 25 Jan. 2016, ISBN10:149190352X

8.2 Laboratory	Teaching methods	No. of hours/ Observations
Presentation of laboratory and work protection. Structure and mode of operation of a microsystem (I)	Debate, measurements, processing of results	2
Structure and mode of operation of a microsystem (II)	Debate, measurements, processing of results	2
Clock signal and reset logic	Debate, measurements, processing of results	2
Microprocessor architecture and data representation	Debate, measurements, processing of results	2
Instruction cycle	Debate, measurements, processing of results	2
ROM memory	Debate, measurements, processing of results	2
Static RAM	Debate, measurements, processing of results	2
Dynamic RAM	Debate, measurements, processing of results	2
Interrupt system	Debate, measurements, processing of results	2
Step-by-step microprocessor operation	Debate, measurements, processing of results	2

Parallel interface	Debate, measurements, processing of results	2
Programmable counter	Debate, measurements, processing of results	2
Serial interface	Debate, measurements, processing of results	2
Evaluation of laboratory activity	Presentation of reports, questions	2

Bibliography

1. Vari K. Ştefan: Microprocesoare şi microcalculatoare, Editura Universităţii din Oradea, ISBN 973-613-235-8, 2002.
2. Poszet O, Beuca M, Bumba M, Costea N, Madar D, Sferle R, Proiectare cu microprocesoare, Îndrumător de laborator, 2020 (format electronic), https://uoradea-my.sharepoint.com/personal/otto_poszet_didactic_uoradea_ro/_layouts/15/onedrive.aspx
3. B. B. Brey, The Intel Microprocesors. Architecture, Programming and Interfacing, Prentice Hall, 8th Edition, ISBN 978-8131726228, 2011.
4. S. Mueller, PC Repair and Upgrading, Que Publishing, 2015.
5. R. B. Reese, J. W. Bruce, Microcontrollers: from Assembly Language to C Using the PIC24 Family, Cengage Learning PTR, 2014.
6. T. Wilmshurst, Designing Embedded Systems with PIC Microcontrollers, Newnes, 2009.
7. M. A. Mazidi, D. Causey, R. McKinlay, PIC Microcontroller and Embedded Systems, MicroDigitalEd, 2016
8. Walter Triebel, Avtar Singh, 8088 and 8086 Microprocessors : Programming, Interfacing, Software, Hardware, and Applications - 4th edition, ISBN13: 9780130452313, ISBN10: 0130452319, Publisher: Prentice Hall, Inc., Published: 2003
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10. Frederick M Cady, Microcontrollers and Microcomputers: Principles of Software and Hardware Engineering, Cady, F., Oxford University Press, 2010.
11. Michael Margolis, Arduino Cookbook: Recipes to Begin, Expand, and Enhance Your Projects Paperback – Illustrated, O'Reilly Media, 25 Jan. 2016, ISBN10:149190352X

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The discipline provides theoretical and practical knowledge directly applicable in the computer industry and in the field of information technology services.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard	Written exam. The evaluation can be done face to face or online.	80%
10.5 Academic seminar	Minimum required conditions for passing the examination (grade 5): in accordance with		

	the minimum performance standard		
10.6 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard	Report. Questions. The evaluation can be done face to face or online.	Condition + 20%
10.7 Project			
10.8 Minimum performance standard: Course: Pass mark from 50% of the requirements met. Academic seminar: Laboratory: Pass. Project:			

Completion date:
25.09.2023

Signature of the course owner

Ş.L.Dr.Ing. Poszet Otto
poszet@uoradea.ro

Signature of the seminar/ laboratory/project owner
Ş.L.Dr.Ing. Poszet Otto
poszet@uoradea.ro

Date of endorsement in the department:
27.09.2023

Signature of Department Director
Conf. Dr. Ing. Alexandrina Mirela Pater
.....

Date of endorsement in the Faculty Board:
29.09.2023

Signature of Dean
Prof. Dr. Ing. Habil Francisc Ioan Hathazi
.....

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	Department of Computers and Information Technology
1.4 Field of study	Computers and Information Technology
1.5 Study cycle	Bachelor
1.6 Study program/Qualification	Computers/ Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject		**Mobile and web applications design**					
2.2 Holder of the subject		Prof. dr. ing. Gyorodi Robert Stefan					
2.3 Holder of the academic seminar/laboratory/project		Prof. dr. ing. Gyorodi Robert Stefan					
2.4 Year of study	III	2.5 Semester	2	2.6 Type of the evaluation	Vp	2.7 Subject regime	SD

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	0/2/0
3.4 Total of hours from the curriculum	56	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	0/28/0

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	7
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	4
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	4
Tutorials	2
Examinations	2
Other activities.	

3.7 Total of hours for individual study	**19**
3.9 Total of hours per semester	**75**
3.10 Number of credits	3

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions) Computer programming and programming languages I
4.2 related to skills	Structured programming in the C language/ C ++ / Java object-oriented

5. Conditions (where applicable)

5.1. for the development of the course	Classroom equipped with video projector and computer. The course can be held face to face or online
5.2.for the development of the academic seminary/laboratory/project	Laboratory equipped with video projector and computers that are connected to the internet. They have installed XAMPP, Visual Studio 2019, Android Studio 4.2, Eclipse with Java EE, Android SDK & NDK,

	Windows SDK, mac OS 11 with XCode 12.2 and iOS SDK, Node.js. The laboratory can take place face to face or online
6. Specific skills acquired	
Professional skills	C5. Designing, lifecycle management, integration and integrity of hardware, software and communication systems C6. Designing intelligent systems
Transversal skills	

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ The course contributes to the acquisition of practical and design skills in the use of technologies for the design of mobile applications for current devices.
7.2 Specific objectives	▪ This course is designed to develop both practical skills and understanding of current mobile technologies: architectures of mobile devices and mobile operating systems, design of user interfaces for mobile devices, mobile websites, client-side programming, including Ajax. Use of technologies such as ASP.NET, Node.js, respectively those based on Java, acquiring the concepts underlying the development and use of web services, application development concepts for the main families of mobile devices: Android, iOS, Windows, using a unitary framework for the development of multi-platform applications.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Introduction, native mobile applications or hybrid apps	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
2. Concepts of hybrid cross-platform application development Angular, React / Native, Ionic		2 hours
3. Techniques for developing hybrid applications - Ionic, Angular		2 hours
4. Techniques for developing hybrid applications - Ionic, React Native		2 hours
5. Architectures of mobile devices and mobile operating systems		2 hours
6. Principles of application development for the Android platform		6 hours
7. Advanced concepts for Android platform application development		10 hours
8. The future evolution of technologies for mobile and web devices		2 hours

Bibliography

1. Professional Mobile Application Development, Jeff McWherter, Scott Gowell, John Wiley & Sons, 2012, ISBN 978-1-118-20390-3
2. Android Cookbook, 2nd Ed., Ian F. Darwin, O'Reilly, 2017, ISBN 978-1449374433
3. Android Apps Security, Sheran Gunasekera, APress, 2012, ISBN 978-1-4302-4062-4

4. Android Database Programming, Jason Wei, Packt Publishing, 2012, ISBN 978-1-84951-812-3
5. Android Application Testing Guide, Diego Torres Milano, Packt Publishing, 2011, ISBN 978-1-849513-50-0
6. Android UI Fundamentals: Develop and Design, Jason Ostrander, Peachpit Press, 2012, ISBN 978-0-321-81458-6
7. Beginning iOS Storyboarding with Xcode, Rory Lewis, Yulia McCarthy și Stephen M. Moraco, APress, 2012, ISBN 978-1-4302-4272-7
8. UX Strategy: How to Devise Innovative Digital Products that People Want, Jaime Levy, O'Reilly Media, 2015, ISBN 9781449372866
9. Designing Multi-Device Experiences: An Ecosystem Approach to User Experiences across Devices, Michal Levin, O'Reilly Media, 2014, ISBN 9781449340384
10. Mobile Design Pattern Gallery: UI Patterns for Smartphone Apps, 2nd Ed, Theresa Neil, O'Reilly Media, 2014, ISBN 9781449363635
11. Build Mobile Apps with Ionic 4 and Firebase: Hybrid Mobile App Development, 2nd Ed., Fu Cheng, Apress, 2018, ISBN 978-1484237748
12. Ionic Cookbook, 3rd Ed., Indermohan Singh,Hoc Phan, Packt Publishing, 2018, ISBN 9781788623230
13. Mastering Android Application Development, Antonio Pachon Ruiz, Packt Publishing, 2015, ISBN 9781785884221
14. Android Studio 4.1 Development Essentials - Java Edition, Neil Smyth, Payload Media, Inc., 2020, ISBN 9781951442255
15. Android Programming for Beginners, 2nd Ed., John Horton, Packt Publishing, 2018, ISBN 9781789538502
16. Android Security Internals, Nikolay Elenkov, No Starch Press, 2014, ISBN 9781593275815
17. Android 9 Development Cookbook, 3rd Ed., Rick Boyer, Packt Publishing, 2018, ISBN 9781788991216
18. Head First iPhone & iPad Development, 3rd Ed, Tracey Pilone & Dan Pilone, O'Reilly Media, 2013, ISBN 9781449316570
19. iOS 14 Programming Fundamentals with Swift, Matt Neuburg, O'Reilly Media, 2020, ISBN 9781492092094
20. Programming iOS 14, Matt Neuburg, O'Reilly Media, 2020, ISBN 9781492092179
21. Real World Windows 10 Development, 2nd Ed, Edward Moemeka & Elizabeth Moemeka, Apress, 2016, ISBN 9781484214497
22. Mastering Xamarin.Forms, 3rd Ed., Ed Snider, Packt Publishing, 2019, ISBN 9781839213380
23. https://e.uoradea.ro/course/view.php?id=6139 Materials (courses and laboratories)

8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
1. JavaScript / TypeScript, CSS, HTML5 - advanced concepts	Powerpoint presentation with the help of the video projector/Oral presentation. The students are assessed by a practical test using computer from laboratory topics.	2 hours
2. Creating web services that can be consumed from mobile devices. - ASP.NET - Node.js - Java		2 hours
3. Multi-platform application development		4 hours
4. Development of applications for the Android platform		4 hours
5. Development of a solution for Android and / or multi-platform		14 hours
6. Final test		2 hours

Bibliography

1. Android Apps Security, Sheran Gunasekera, APress, 2012, ISBN 978-1-4302-4062-4
2. Android Database Programming, Jason Wei, Packt Publishing, 2012, ISBN 978-1-84951-812-3
3. Android Application Testing Guide, Diego Torres Milano, Packt Publishing, 2011, ISBN 978-1-849513-50-0
4. Android UI Fundamentals: Develop and Design, Jason Ostrander, Peachpit Press, 2012, ISBN 978-0-321-81458-6
5. Beginning iOS Storyboarding with Xcode, Rory Lewis, Yulia McCarthy și Stephen M. Moraco, APress, 2012, ISBN 978-1-4302-4272-7

6. UX Strategy: How to Devise Innovative Digital Products that People Want, Jaime Levy, O'Reilly Media, 2015, ISBN 9781449372866
7. Designing Multi-Device Experiences: An Ecosystem Approach to User Experiences across Devices, Michal Levin, O'Reilly Media, 2014, ISBN 9781449340384
8. Mobile Design Pattern Gallery: UI Patterns for Smartphone Apps, 2nd Ed, Theresa Neil, O'Reilly Media, 2014, ISBN 9781449363635
9. Build Mobile Apps with Ionic 4 and Firebase: Hybrid Mobile App Development, 2nd Ed., Fu Cheng, Apress, 2018, ISBN 978-1484237748
10. Ionic Cookbook, 3rd Ed., Indermohan Singh,Hoc Phan, Packt Publishing, 2018, ISBN 9781788623230
11. Mastering Android Application Development, Antonio Pachon Ruiz, Packt Publishing, 2015, ISBN 9781785884221
12. Android Studio 4.1 Development Essentials - Java Edition, Neil Smyth, Payload Media, Inc., 2020, ISBN 9781951442255
13. Android Programming for Beginners, 2nd Ed., John Horton, Packt Publishing, 2018, ISBN 9781789538502
14. Android Security Internals, Nikolay Elenkov, No Starch Press, 2014, ISBN 9781593275815
15. Android 9 Development Cookbook, 3rd Ed., Rick Boyer, Packt Publishing, 2018, ISBN 9781788991216
16. Head First iPhone & iPad Development, 3rd Ed, Tracey Pilone & Dan Pilone, O'Reilly Media, 2013, ISBN 9781449316570
17. iOS 14 Programming Fundamentals with Swift, Matt Neuburg, O'Reilly Media, 2020, ISBN 9781492092094
18. Programming iOS 14, Matt Neuburg, O'Reilly Media, 2020, ISBN 9781492092179
19. Real World Windows 10 Development, 2nd Ed, Edward Moemeka & Elizabeth Moemeka, Apress, 2016, ISBN 9781484214497
20. Mastering Xamarin.Forms, 3rd Ed., Ed Snider, Packt Publishing, 2019, ISBN 9781839213380
21. https://e.uoradea.ro/course/view.php?id=6139 Materials (courses and laboratories)

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline corresponds to the requirements necessary for the design and implementation of applications for mobile and web devices.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard: 50% of the subjects from the final exam should be correctly solved - For 10: 100% of the subjects from the final exam should be correctly solved	Semester exam – written Two Assessments during the semester from the course and laboratory subjects.	50%
10.5 Academic seminar	-	-	-
10.6 Laboratory	Minimum required conditions for promotion	Oral/written	50%

	(grade 5): in accordance with the minimum performance standard: 50% of the problems from the final laboratory test should be correctly solved - For 10: 100% of the problems from the final laboratory test should be correctly solved	Evaluation of applications and interpretation of results	
10.7 Project	-	-	-
10.8 Minimum performance standard: Course: 50% of the maximum score of the cumulate assessments Academic seminar: Laboratory: 50% of the maximum score of the laboratory evaluations Project:			

	Course instructor	Head of department
Completion date: 26.09.2023	prof. dr. ing. Győrödi Robert E-mail: rgyorodi@uoradea.ro	conf. dr. ing. Pater Mirela

Date of endorsement in the department:
27.09.2023

Date of endorsement in the Faculty Board:
29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Computers and Information Technology**
1.4 Field of study	**Computers and Information Technology**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Computers / Information Technology / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject		**NUMERICAL METHODS**					
2.2 Holder of the subject		**Ș.l.dr.inf. Bolojan Octavia-Maria**					
2.3 Holder of the academic seminar/laboratory/project		**Ș.l.dr.inf. Bolojan Octavia-Maria**					
2.4 Year of study	II	2.5 Semester	III	2.6 Type of the evaluation	Vp	2.7 Subject regime	FD

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	14	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	0/2/0
3.4 Total of hours from the curriculum	56	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	0/28/0
Distribution of time					56 hours
Study using the manual, course support, bibliography and handwritten notes					28
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					8
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					12
Tutorials					2
Examinations					6
Other activities.					
3.7 Total of hours for individual study	**56**				
3.9 Total of hours per semester	**112**				
3.10 Number of credits	**4**				

4. Pre-requisites (where applicable)

4.1 related to the curriculum	Students must have fundamental knowledge from the following disciplines: Linear algebra, Mathematical analysis, Differential equations, Computer programming and programming languages I
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	Classroom equipped with video projector and computer, blackboard, flipcharts, chalk, markers. The course can be held face to face or online.
5.2.for the development of the academic seminary/laboratory/project	Laboratory equipped with computers that are connected to the Internet and dedicated software installed (Matlab). The laboratory can be held face to face or online.

6. Specific skills acquired	
Professional skills	• **CP3.** Solving problems using computer science and engineering instruments • **CP4.** Design and integration of information systems using technologies and programming environments
Transversal skills	• **CT1:** Responsible execution of professional tasks, respecting the values and ethics of the engineering profession, in conditions of limited autonomy and qualified assistance, based on documentation, convergent and divergent logical reasoning, practical applicability, evaluation, self-evaluation and optimal decision: responsible executor for professional tasks; • **CT2:** Identifying, describing and carrying out the processes in project management, taking over the different roles in the team and clearly and concisely describing, verbally and in writing, the results in the field of activity; • **CT3:** Objective self-assessment of the need for professional development and openness to lifelong learning, as well as the efficient use of language skills, knowledge of information technology and communication for personal and professional development: aware of the need for lifelong learning.

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ Identify classes of problems and methods of solving characteristic of computer systems. ▪ Using interdisciplinary knowledge, solution patterns and tools, conducting experiments and interpreting their results.
7.2 Specific objectives	▪ Effective implementation of an application using computer science tools. ▪ Development and implementation of IT solutions for concrete problems. ▪ Comparative evaluation, including experimental, of solving alternatives, to optimize performance. ▪ Application of solution patterns using engineering tools and methods.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Introduction to Matlab programming 1.1. Introduction 1.2. Instructions and commands in Matlab. Matlab functions	Lecture and Scientific Workplace pdf slides presentation with the help of the video projector; free discussions.	2
1.3. Matlab graphics 1.3.1. Functions for two-dimensional graphical representations 1.3.2. Functions for three-dimensional graphical representations	Lecture and Scientific Workplace pdf slides presentation with the help of the video projector; free discussions.	2
2. Errors and Floating Point Arithmetic. Introductory notions 2.1. Absolute error. Relative error. 2.2. Exact significant digits	Lecture and Scientific Workplace pdf slides presentation with the help of the	2

2.3. Error sources	video projector; free discussions.	
3. Numerical Methods for solving linear algebraic systems 3.1. Direct methods 3.1.1. Gaussian Elimination 3.1.2. LU (Lower-Upper) Factorization	Lecture and Scientific Workplace pdf slides presentation with the help of the video projector; free discussions.	2
3.2. Indirect methods 3.2.1. Jacobi Method. Gauss-Seidel Method 3.2.2. SOR (Successive Over-Relaxation)	Lecture and Scientific Workplace pdf slides presentation with the help of the video projector; free discussions.	2
4. Function Approximation 4.1. Function interpolation 4.1.1. Lagrange Interpolation 4.1.2. Spline Interpolation 4.1.3. Matlab functions for interpolation	Lecture and Scientific Workplace pdf slides presentation with the help of the video projector; free discussions.	4
4.2. The least square approximation 4.2.1. Linear regression 4.2.2. Polynomial regression 4.2.3. Matlab functions for regression	Lecture and Scientific Workplace pdf slides presentation with the help of the video projector; free discussions.	2
5. Solving nonlinear equations 5.1. Successive approximation method 5.2. Bisect method 5.3. Tangent method 5.4. Secant method	Lecture and Scientific Workplace pdf slides presentation with the help of the video projector; free discussions.	2
5.5. Newton-Raphson method for solving nonlinear systems of equations	Lecture and Scientific Workplace pdf slides presentation with the help of the video projector; free discussions.	2
6. Numerical Differentiation and Numerical Integration 6.1 Finite differences. Numerical differentiation of functions	Lecture and Scientific Workplace pdf slides presentation with the help of the video projector; free discussions.	2
6.2. Trapezoidal numerical integration. Quadrature methods 6.3. Simpson's formulas. Quadrature formulas	Lecture and Scientific Workplace pdf slides presentation with the help of the video projector; free discussions.	2
6.4. Newton-Cotes quadrature formulas. Numerical integration commands using Matlab	Lecture and Scientific Workplace pdf slides presentation with the help of the video projector; free discussions.	2
6.5 Gauss quadrature formula.	Lecture and Scientific Workplace pdf slides presentation with the help of the video projector; free discussions.	2

Bibliography

1. O. Agratini, I. Chiorean, Gh. Coman, R. Trîmbiţaş, *Analiză numerică şi teoria aproximării*, vol. III, Editura Presa Universitară Clujeană, 2002.
2. O.-M. Bolojan, M.-A. Șerban, *Metode numerice. Exerciții și probleme rezolvate în Matlab*, Editura Casa Cărţii de Ştiinţă, Cluj-Napoca, 2016, ISBN 978-606-17-1070-6 (format electronic).
3. O.-M. Bolojan, *Metode numerice* (notițe de curs, prezentări Beamer-Scientific Workplace).
4. T. Cătinaş, Gh. Coman, I. Chiorean, *Numerical Analysis. Advanced Course*, Editura Presa Universitară

Clujeană, Cluj-Napoca, 2007.
5. T. Cătinaş, I. Chiorean, R. Trîmbiţaş, *Analiză numerică*, Editura Presa Universitară Clujeană, Cluj-Napoca, 2010.
6. R. Despa, C. Coculescu, *Metode Numerice*, Editura Universitară, Bucureşti, 2006.
7. C. V. Muraru, *Metode Numerice: Seminarii Matlab*, Editura EduSoft, Bacău, 2005.
8. S. Nakamura, *Numerical Analysis and Graphic Visualization with Matlab*, The Ohio State University, Columbus, Ohio, 1996.
9. S.S. Rao, Applied *Numerical Methods for Engineers and Scientists*, Pretince Hall, University of Miami, Florida, 2002.
10. C. Vancea, F. Vancea, *Metode Numerice prezentate în Matlab*, Editura Universităţii Oradea, 2001.
11. C. Vancea, *Metode Numerice în Electrotehnică*, Editura Universitţii Oradea, 2005.
12. E. Zauderer, *Partial Differential Equation of Applied Mathematics*, Wiley Interscince Publication, 1989.

8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
1. Introduction to Matab. Using the Matlab programming environment	Lecture/Oral presentation. Testing and discussing practical examples and problems from courses/laboratory tutorials. Solving and implementing programs and applications/practical examples in Matlab programming environment	4
2. Using the Matlab graphics environment	Lecture/Oral presentation. Testing and discussing practical examples and problems from courses/laboratory tutorials. Solving and implementing programs and applications/practical examples in Matlab programming/graphics environment	4
3. Programs and software applications for solving direct linear algebraic systems. Using Matlab and C ++ languages	Lecture/Oral presentation. Testing and discussing practical examples and problems from courses/laboratory tutorials. Solving and implementing programs and applications/practical examples in Matlab and C++ programming environments	2
4. Programs and software applications for solving iterative linear algebraic systems. Using Matlab and C ++ languages.	Lecture/Oral presentation. Testing and discussing practical examples and problems from	2

	courses/laboratory tutorials. Solving and implementing programs and applications/practical examples in Matlab and C++ programming environments	
5. Programs for polynomial interpolation. Lagrange interpolation. Using the Matlab programming environment.	Lecture/Oral presentation. Testing and discussing practical examples and problems from courses/laboratory tutorials. Solving and implementing programs and applications/practical examples in Matlab	2
6. Spline interpolations. Using the Matlab programming environment.	Lecture/Oral presentation. Testing and discussing practical examples and problems from courses/laboratory tutorials. Solving and implementing programs and applications/practical examples in Matlab	2
7. Programs for linear regression and polynomial regression. Using the Matlab programming environment.	Lecture/Oral presentation. Testing and discussing practical examples and problems from courses/laboratory tutorials. Solving and implementing programs and applications/practical examples in Matlab	2
8. Programs for solving nonlinear equations. Bisection method. Using the Matlab programming environment.	Lecture/Oral presentation. Testing and discussing practical examples and problems from courses/laboratory tutorials. Solving and implementing programs and applications/practical examples in Matlab	2
9. Newton's method for nonlinear equations.	Lecture/Oral presentation. Testing and discussing practical examples and problems from courses/laboratory tutorials. Solving and implementing programs and applications/practical examples in Matlab	2
10. Numerical differentiation problems in Matlab.	Lecture/Oral presentation.	2

	Testing and discussing practical examples and problems from courses/laboratory tutorials. Solving and implementing programs and applications/practical examples in Matlab	
11. Numerical integration. The trapezoidal quadrature formula.	Lecture/Oral presentation. Testing and discussing practical examples and problems from courses/laboratory tutorials. Solving and implementing programs and applications/practical examples in Matlab	2
12. Implementation of Simpson's numerical integration formulas.	Lecture/Oral presentation. Testing and discussing practical examples and problems from courses/laboratory tutorials. Solving and implementing programs and applications/practical examples in Matlab.	2

Bibliography

1. U. M. Ascher, L. R. Petzold, *Computer Methods for Ordinary Differential Equations and Differential-Algebraic Equations*, SIAM, Philadelphia PA,1998.
2. O.-M. Bolojan, M.-A. Șerban, *Metode numerice. Exerciții și probleme rezolvate în Matlab*, Editura Casa Cărţii de Ştiinţă, Cluj-Napoca, 2016, ISBN 978-606-17-1070-6 (format electronic).
3. G. Grebenișan, *Metode numerice: aplicații în Matlab: îndrumător de laborator*, Editura Universității din Oradea, 2008.
4. M. H. Holmes, *Introduction to Scientific Computing and Data Analysis*, Springer International Publishing, Switzerland, 2016.
5. C. Moler, *Numerical Computing in MATLAB*, SIAM, 2004, disponibil online la adresa http://www.mathworks.com/moler.
6. M. Novac, O. Novac, C. Vancea: *Metode Numerice. Îndrumător de laborator pentru uzul studenţilor*, EdituraUniversităţii din Oradea, 2003.
7. I. Paraschiv-Munteanu, D. Stănică, *Analiză numerică. Exerciții și teme de laborator – Ed. a 2-a rev.*, Editura Universității din București, 2008.
13. E. Süli, D.F. Mayers, *An Introduction to Numerical Analysis*, Cambridge University Press, Cambridge, 2003
14. R.T. Trîmbițaș, *Analiză numerică. O introducere bazată pe Matlab*, Editura Presa Universitară Clujeană, 2005**.**
15. C. Vancea, *Metode Numerice- Îndrumător de laborator*, Editura Universităţii Oradea, 1995.

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The aim of the course is to form a basic tool, at the disposal of the future engineer, of numerical analysis, for scientific and engineering problems, with the presentation of

numerical methods using programming languages.

- The content of the discipline is consistent and contributes to the acquisition and development of the principles/skills needed in creating and implemeting programs/software applications based on algorithmical thinking.
- The modeling of physical phenomena is increasingly encountered in many scientific and engineering fields and has developed rapidly through complex and multiple numerical methods that allow solutions and simulations with high-performance computing technology, which represents a real progress both in the technical field and in life. daily. The course exists in the curriculum from Romanian/abroad universities.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	1.Analysis and estimation of errors in numerical approximation. 2.Application of numerical approximation methods learned on concrete numerical examples. 3. Choosing the best numerical method in solving a specific problem. Minimum required conditions for passing the exam (mark 5): each subject is solved/treated in accordance with the minimum performance standards. For 10: Correct and complete answers to all subjects/questions/problems/ topics/requirements.	Written paper/exam (2 stages) Students receive for solving topics/subjects/problems that cover the theoretical and applied part of the discipline. (week 7/8 and week 13/14, respectively) The evaluation can be done face to face or online.	VP1: 30% VP2: 30%
10.5 Academic seminar			
10.6 Laboratory	1. Using the Matlab programming environment. 2. Programming skills in Matlab. 3. 2D and 3D graphical representations of the obtained results and their interpretation. 4. Advantages and disadvantages of programming in Matlab. Minimum required conditions for promotion (grade 5 each subject is solved/treated in	Practical laboratory work/exam Students receive for solving topics similar to the applications that were implemented in the laboratory work/classes during the semester. Students receive questions based on the implemented applications. The activity during the	40%

	accordance with the minimum performance standards. For 10: Correct and complete answers to all subjects/questions/problems/ topics/requirements related to programming skills in Matlab.	semester, the fulfillment of the work tasks during the laboratory hours will also be taken into account. (week 13/14) The evaluation can be done face to face or online.	
10.7 Project			
10.8 Minimum performance standard: Course: Grade for written exam/paper: minimum 5.00. Laboratory: Completing all laboratory work/classes, mark for practical exam: minimum 5.00. The calculation of the final grade is done by rounding the final score to the full grade.			

Completion date:
27.09.2023

Course/Laboratory holder:
Ș.l. dr. inf. Bolojan Octavia-Maria
obolojan@uoradea.ro

Date of endorsement in the department:
27.09.2023

Head of the Department:
Conf.univ.dr.ing.Mirela PATER
mpater@uoradea.ro

Date of endorsement in the Faculty Board:
29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	Department of Computers and Information Technology
1.4 Field of study	Computers and Information Technology
1.5 Study cycle	Bachelor
1.6 Study program/Qualification	Computers/ Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject		**Operating Systems**					
2.2 Holder of the subject		Prof. dr. ing. Gyorodi Robert Stefan					
2.3 Holder of the academic seminar/laboratory/project		Sef. Lucr. Dr. Inf. Costea Mirabela					
2.4 Year of study	III	2.5 Semester	1	2.6 Type of the evaluation	Ex	2.7 Subject regime	DD

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	0/2/0
3.4 Total of hours from the curriculum	56	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	0/28/0

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	14
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	14
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	10
Tutorials	4
Examinations	2
Other activities.	

3.7 Total of hours for individual study	**44**
3.9 Total of hours per semester	**100**
3.10 Number of credits	4

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions) Computer programming and programming languages I
4.2 related to skills	Structured programming in the C language

5. Conditions (where applicable)

5.1. for the development of the course	Classroom equipped with video projector and computer. The course can be held face to face or online
5.2.for the development of the academic seminary/laboratory/project	Laboratory equipped with video projector and computers that are connected to the internet. They have installed Dev C / C ++, Visual Studio 2019; Linux server with development tools using the C / C ++ language,

	CLion, Oracle VirtualBox for running virtual machines. The laboratory can take place face to face or online
6. Specific skills acquired	
Professional skills	C2. Designing hardware, software and communication components C5. Designing, lifecycle management, integration and integrity of hardware, software and communication systems
Transversal skills	

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ Learning the basics of operating systems and the possibilities of developing applications based on them.
7.2 Specific objectives	▪ Acquiring knowledge regarding the basic structure of operating systems, process concepts, threads, and process modeling methods, process synchronization, process interlocking issues, and process planning mechanisms.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Introduction	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
2 Structure of a Computer System		2 hours
3 Structure of an Operating System. Operating System Services. Virtual Machines		2 hours
4 System Design and Implementation		2 hours
5 Processes. Process Operations. Cooperative Processes. Interprocess communication. Communication in Client-Server Systems		2 hours
6 Threads. Multithreading Models. Windows Threads. Linux Threads, Java Threads		2 hours
7 CPU planification		2 hours
8 Process Synchronization		2 hours
9 Interblocking Processes		2 hours
10 Unix Operating System		2 hours
11 The Main Unix Commands. Shell Procedures (Shell Scripts)		2 hours
12 Unix Operating System Architecture		2 hours
13 Interprocess Communication under the Unix Operating System		4 hours

Bibliography

1. Sisteme de Operare. Teorie şi Aplicaţii – Robert Győrödi – Editura Universităţii din Oradea, 2000, ISBN 973-8083-22-2
2. Operating System Concepts Global 10th Ed - Abraham Silberschatz, Peter Galvin and Greg Gagne - John Wiley & Sons, Inc., 2019, ISBN 1119454085

<table>
<tr><td colspan="3">3. Operating Systems: Internals and Design Principles, 9/E - William Stallings - Pearson, 2018, ISBN 9781292214344
4. Modern Operating Systems: Global Edition, 4/E - Tanenbaum - Pearson – 2015, ISBN 1292061421
5. Distributed Systems, 3.01 - M. van Steen, A. S. Tanenbaum - 2017, ISBN 9789081540629
6. The Linux Programming Interface - Michael Kerrisk - No Starch Press - 2010, ISBN 978-1-59327-220-3
7. Hands-On System Programming with Linux - Kaiwan N Billimoria - Packt Publishing - 2018, ISBN 978-1-78899-847-5
8. PowerShell for SysAdmins - Adam Bertram - No Starch Press - 2020, ISBN 1593279183
9. https://e.uoradea.ro/course/view.php?id=6139 Materials (courses and laboratories)</td></tr>
<tr><td>8.2 Academic laboratory</td><td>Teaching methods</td><td>No. of hours/ Observations</td></tr>
<tr><td>1. Indirect Commands files in DOS</td><td rowspan="12">Powerpoint presentation with the help of the video projector/Oral presentation.

The students are assessed by a practical test using computer from laboratory topics.</td><td>2 hours</td></tr>
<tr><td>2. DOS interruptions</td><td>2 hours</td></tr>
<tr><td>3. Calls of DOS System for working with I/O standard</td><td>2 hours</td></tr>
<tr><td>4. Working with Directories / Folders</td><td>4 hours</td></tr>
<tr><td>5. File Management by Logical Identifier</td><td>2 hours</td></tr>
<tr><td>6. Process Management in DOS</td><td>4 hours</td></tr>
<tr><td>7. Familiarization with UNIX operating system</td><td>2 hours</td></tr>
<tr><td>8. UNIX Indirect Commands</td><td>2 hours</td></tr>
<tr><td>9. The Process of Creating and Compiling a Program in UNIX</td><td>2 hours</td></tr>
<tr><td>10. Working with files and process management in UNIX</td><td>2 hours</td></tr>
<tr><td>11. Interprocess communication through messages</td><td>2 hours</td></tr>
<tr><td>12. Final test</td><td>2 hours</td></tr>
<tr><td colspan="3">Bibliography
1. Győrödi Robert, Mogyorosi Stefan “Sisteme de Operare. Aplicatii practice”, Editura Universității din Oradea, 2008, ISBN 978-973-759-624-6, nr. pag 198.
2. https://e.uoradea.ro/course/view.php?id=6139 Materials (courses and laboratories)</td></tr>
</table>

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline corresponds to the requirements necessary to acquire the concepts underlying the design and implementation of an operating system.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard: 50% of the subjects from the final exam should be correctly solved - For 10: 100% of the subjects from the final exam should be correctly solved	Semester exam – written	60%
10.5 Academic seminar	Minimum required conditions for passing	-	-

	the examination (grade 5): in accordance with the minimum performance standard - For 10:		
10.6 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard: 50% of the problems from the final laboratory test should be correctly solved - For 10: 100% of the problems from the final laboratory test should be correctly solved	Oral/written	40%
10.7 Project			
10.8 Minimum performance standard: Course: 50% of the maximum score of the final exam Academic seminar: Laboratory: 50% of the maximum score of the laboratory evaluations Project:			

Course instructor

Head of department

Completion date:
26.09.2023

prof. dr. ing. Győrödi Robert
E-mail: rgyorodi@uoradea.ro

conf. dr. ing. Pater Mirela

Date of endorsement in the department:

27.09.2023

Date of endorsement in the Faculty Board:

29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	Department of Computers and Information Technology
1.4 Field of study	Computers and information technology
1.5 Study cycle	Bachelor
1.6 Study program/Qualification	Computers / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject		**Parallel and distributed algorithms**					
2.2 Holder of the subject		**Pecherle George Dominic**					
2.3 Holder of the academic seminar/laboratory/project		**Pecherle George Dominic**					
2.4 Year of study	III	2.5 Semester	5	2.6 Type of the evaluation	Vp	2.7 Subject regime	I

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	3	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	0/1/0
3.4 Total of hours from the curriculum	42	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	0/14/0

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	10
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	10
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	5
Tutorials	5
Examinations	3
Other activities.	

3.7 Total of hours for individual study	**33**
3.9 Total of hours per semester	**75**
3.10 Number of credits	3

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions)
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	Classroom equipped with video projector and computer. The course can be held face to face or online.
5.2.for the development of the academic	Laboratory equipped with computers that are connected to the Internet and have installed the following programs: XAMPP, Sublime or Visual Studio

seminary/laboratory/project	Code. The seminar / laboratory / project can be held face to face or online

6. Specific skills acquired	
Professional skills	C2. Design of hardware, software and communications components C3. Problem solving using computer science and engineering tools The course aims to present the principles of developing programs for parallel computing and studying parallel programming methods.
Transversal skills	

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	The course aims to present the principles of developing programs for parallel computing and studying parallel programming methods.
7.2 Specific objectives	The course aims to become familiar with the principles of developing programs for parallel computing and to study methods of parallel programming in the Java language.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
Chapter 1. Basic Java	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Chapter 2. Parallel programming in Java by example	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Chapter 3. Interfaces in Java	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Chapter 4. Exceptions and assertions	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Chapter 5. Generics in Java	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Chapter 6. Collections - part 1	Powerpoint presentation with the help of the video projector;	2 hours

	free discussions;	
Chapter 7. Collections - part 2	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Chapter 8. Sorting and searching algorithms in Java	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Chapter 9. String processing	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Chapter 10. Regular expressions	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Chapter 11. Parallel processing for input and output systems	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Chapter 12. JDBC - databases - part 1	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Chapter 13. JDBC - databases - part 2	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Chapter 14. Java Concurrency	Powerpoint presentation with the help of the video projector; free discussions;	2 hours

Bibliography

1. T. CORMEN, L. LEISERSON, R. RIVEST, *Introduction to Algorithms*, 2000
2. D. E. KNUTH, *The Art of Computer Programming*, Vol.1 and 3, Sorting and Searching, Addison-Wesley, Reading, Mass., 1973.
3. G. CIOBANU, Gh. PAUN, G. MAURI (Eds.). *Applications of Membrane Computing*, Springer 2005
4. M.J. QUINN. *Parallel Computing. Theory and Practice*, McGraw—Hill Series in Computer Science, 1994.
5. Gh. PAUN, *Membrane Computing. An Introduction*. Springer-Verlag, Berlin, 2002
6. Craus M., *Algoritmi pentru prelucrări paralele*, Editura "Gh.Asachi", Iaşi, 2002
7. Petcu D., Negru V., *Procesare distribuită*, Editura Universităţii de Vest, Seria Alef, Timişoara, 2002
8. http://www.cs.utah.edu/~mhall/cs4230f12/

8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
Interfaces, exceptions and assertions	Powerpoint presentation with the help of the video projector; free discussions;	2 hours

Generic and collections	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Sorting and searching	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
String and regular expression processing	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Input and output systems, databases - JDBC	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
Java Concurrency	Powerpoint presentation with the help of the video projector; free discussions;	2 hours

Bibliography

- Craus M., *Algoritmi pentru prelucrări paralele*, Editura "Gh.Asachi", Iaşi, 2002
- Petcu D., Negru V., *Procesare distribuită*, Editura Universităţii de Vest, Seria Alef, Timişoara, 2002
- Foster I.; Designing and building parallel programs; An online Publishing Project of Addison-Wesley Inc.; http://www-unix.mcs.anl.gov/dbpp/, 1997.;
- Geist A., Beguelin A., Dongarra J., Jiang W., ManchekR., Sunderam V.; PVM: Parallel Virtual Machine - A User's Guide and Tutorial for Networked Parallel Computing, MIT Press, 1994.
- http://www.cs.utah.edu/~mhall/cs4230f12/

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

The content of the discipline contributes to the acquisition of the principles of the elaboration of the programs for the parallel calculation.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard - For 10:	Course evaluation and implementation of parallel algorithms. The evaluation can be done face to face or online	66%
10.5 Academic seminar	Minimum required conditions for passing the examination (grade 5): in accordance with the minimum		

	performance standard - For 10:		
10.6 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard - For 10:	Checking the implementation of some algorithms. The evaluation can be done face to face or online	34%
10.7 Project			
10.8 Minimum performance standard: C2. Carrying out projects in areas of knowledge C3. Effective implementation of an application using computer science tools			

Completion date: September 27, 2023

Date of endorsement in the department: September 27, 2023

Date of endorsement in the Faculty Board: September 27, 2023

HELPFUL HINTS (*to be erased after completion*):

[1)] Choose one of the followings:
- Department of Control Systems Engineering and Management
- Department of Computers and Information Technology
- Department of Electrical Engineering
- Department of Electronics and Telecommunications

[2)] Choose one of the followings:
- Control systems engineering
- Computers and information technology
- Electrical engineering
- Electronical engineering, telecommunications and information technologies
- Engineering and management

[3)] Choose one of the followings:
- Bachelor (1st cycle)
- Master (2nd cycle)

[4)] Choose one of the followings:
A. Bachelor study programs:
- Applied Electronics
- Automatics and Applied Informatics
- Computers
- Economic Engineering in Electric, Electronic and Energetic Field
- Electrical Engineering and Computers
- Electrical Systems
- Electromechanics

- Electromechanics (at Beius)
- Information Technology
- Networks and Softwares for Telecommunications

B. Master study programs:
- Audio-Video Technologies and Telecommunications
- Advanced Systems in Electrical Engineering
- Management in Information Technology
- Advanced Control Systems
- Management and Communication in Engineering

[5)] Choose one of the followings:
- Bachelor of Engineering
- Master of Science in Engineering

[6)] According to the curriculum

[7)] Choose one of the followings, according to the curriculum:
- Ex. - Examination
- Cv. - Colloquium
- Vp - Continuous Assessment
- Pr - Project
- A/R- Passed/Failed

[8)] Choose one of the followings, according to the curriculum:

A. For Bachelor study programs:
- GD - General Discipline
- FD - Fundamental Discipline
- SD - Specialized Discipline
- CD - Complementary Discipline
- FD - Field Discipline
- DP - Practical Activities
- UO - University Choice

B. For Master study programs:
- THD - Thoroughgoing Disciplines
- SYD - Synthesis Disciplines
- AKD - Advanced Knowledge Disciplines
- UO - University Choice

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**1) Computers and information technology**
1.4 Field of study	**2) Computers and information technology**
1.5 Study cycle	**3) Bachelor**
1.6 Study program/Qualification	**4) / 5) Computers/Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject			**[6] Software engineering I**				
2.2 Holder of the subject			Associate Assistant dr. OVIDIU COMAN				
2.3 Holder of the academic seminar/laboratory/project			Associate Assistant dr. OVIDIU COMAN				
2.4 Year of study	III	2.5 Semester	6	2.6 Type of the evaluation	[7] Ex	2.7 Subject regime	[8] SD

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	0/2
3.4 Total of hours from the curriculum	56	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	0/28

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	38
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	20
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	28
Tutorials	4
Examinations	8
Other activities.	

3.7 Total of hours for individual study	**98**
3.9 Total of hours per semester	**154**
3.10 Number of credits	**4**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions)
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	Classroom equipped with video projector - Attendance at least 50% of the courses

5.2.for the development of the academic seminary/laboratory/project	Room equipped with computers and specific programs - Mandatory attendance at all laboratories; - A maximum of 3 works can be recovered during the semester (20%);

6. Specific skills acquired	
Professional skills	C4 - Improving the performance of software systems • Identifying and describing the defining elements of software system performance • Explaining the interaction of factors that determine the performance of software systems • Design and integration of information systems using technologies and programming environments. C5 - Design, life cycle management, integration and integrity of software systems. • Specifying the relevant criteria regarding the life cycle, quality, safety and interaction of the computer system with the environment and with the human operator • The use of interdisciplinary knowledge for the adaptation of the computer system in relation to the requirements of the field of applications
Transversal skills	CT1. Honorable, responsible, ethical conduct in the spirit of the law to ensure the reputation of the profession

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ Development and study of theories, methods and tools necessary for software development ▪ Definitions, classifications, terminology as well as models for describing and approaching problems ▪ Visibility of processes, professional responsibility ▪ The first stages of developing a software project are underway
7.2 Specific objectives	▪ Adequate use of quality, safety and security standards in information processing ▪ Carrying out a small and medium-sized project including problem identification and analysis, design, development and demonstrating an understanding of the need for quality ▪ Structural design. Object-oriented design. ▪ Forming a correct design style for a software application

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
Chapter 1. Introduction to programming engineering.	Presentation, free discussions	2
Chapter 2. Socio-technical systems and critical systems.	Presentation, free discussions	2
Chapter 3. Software processes.	Presentation, free discussions	2
Chapter 4. Project management.	Presentation, free discussions	4
Chapter 5. Software requirements.	Presentation, free discussions and report	4
Chapter 6. Requirements engineering processes.	Presentation, free discussions	2
Chapter 7. System models in requirements engineering.	Presentation, free discussions and report	2
Chapter 8. Specifications of critical systems.	Presentation, free discussions	2
Chapter 9. Formal specifications.	Presentation, free discussions	2
Chapter 10. Architectural design.	Presentation, free discussions	2
Chapter 11. Distributed systems architecture	Presentation, free discussions	2
Chapter 12. Application architecture	Presentation, free discussions.	2

Bibliography

1. Software Engineering - Ian Sommerville, Editura Addison-Wesley, 2000
2. Software Engineering. Principles and practice - Hans van Vliet, Editura John Wiley & Sons, 2010

3. Software Engineering - modern approaches. - Eric J. Braude, Michael E. Bernstein, Editura John Wiley & Sons, 2008		
8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
laboratory		
1. Introduction to Programming Engineering. Presentation of the requirements at the IP laboratory.	Introductory lecture; free and individual discussions; implementation of proposed programs.	2
2. Organizing teams. Models of organization.	Introductory lecture; free and individual discussions; implementation of proposed programs.	2
3. UML language	Introductory lecture; free and individual discussions; implementation of proposed programs.	4
4. CASE TOOLS	Introductory lecture; free and individual discussions; implementation of proposed programs.	6
5. Requirements collection phase.	Introductory lecture; free and individual discussions; implementation of proposed programs.	6
6. System specification.	Introductory lecture; free and individual discussions; implementation of proposed programs.	4
7. Object-oriented analysis	Introductory lecture; free and individual discussions; implementation of proposed programs.	4
Bibliography 1. Ingineria programarii, indrumator de laborator - I. Mang, R. Gyorodi, Al. Toth, Univ. din Oradea, 2001 2. Software Engineering. Principles and practice - Hans van Vliet, Editura John Wiley & Sons, 2010 3. Software Engineering - modern approaches. - Eric J. Braude, Michael E. Bernstein, Editura John Wiley & Sons, 2008		

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- Use of specific theories and tools to explain the operation and structure of software systems
- Description of the structure and operation of simple software components
- Explaining the role, interaction and operation of software system components
- The content of the discipline is adapted to the requirements of specialized companies.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the	Final course evaluation and problem solving.	40%

	minimum performance standard - For 10: the correct solving of all the subjects at the exam, the presence and activity at courses Activity at classes and essays	Presentation of papers, attendance at courses	20%
10.5 Academic seminar	Minimum required conditions for passing the examination (grade 5): in accordance with the minimum performance standard - For 10:		
10.6 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard Checking the theoretical preparation for the laboratory class and the way of accomplishing the proposed topics. In order to participate in the exam, it is necessary to perform all the laboratory works and to obtain a grade of 5 for the activity carried out during the semester. - For 10: the presence and activity at laboratory	Weekly evaluation of the laboratory preparation Tracking the activity along the way, practical applications.	40%
10.7 Project			
10.8 Minimum performance standard: Course: Academic seminar: Laboratory: Project: - Carrying out projects respecting ethical and responsible behavior; - To be able to solve small and medium size problems in a POO manner in C ++ and Java. - To know the design methods that are used and the differences between them.			

Completion date: 15.09.2023

Date of endorsement in the department: 27.09.2023

Date of endorsement in the Faculty Board: 29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	*Computers and Information Technology*
1.4 Field of study	*Computers and Information Technology*
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	*Information Technology /* Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject	*Security of systems and applications*						
2.2 Holder of the subject	**Prof.dr.habil.eng. Daniela Elena Popescu**						
2.3 Holder of the academic seminar/laboratory/project	**Prof.dr.habil.eng. Daniela Elena Popescu**						
2.4 Year of study **III**		2.5 Semester **6**		2.6 Type of the evaluation	**Ex**	2.7 Subject regime	**DS**

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**4**	of which: 3.2 course	**2**	3.3 academic seminar/laboratory/project	**1/1**
3.4 Total of hours from the curriculum	**56**	Of which: 3.5 course	**28**	3.6 academic seminar/laboratory/project	**28**

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	28
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	8
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	**14**
Tutorials	2
Examinations	4
Other activities.	

3.7 Total of hours for individual study	**56**
3.9 Total of hours per semester	**112**
3.10 Number of credits	**4**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions) Operating Systems
4.2 related to skills	Computer Systems Architecture

5. Conditions (where applicable)

5.1. for the development of the course	- The course can be held face to face or online " - attendance at least 50% of the courses
5.2.for the development of the academic seminary/laboratory/project	- The seminar / laboratory / project can be held face to face or online - Mandatory presence at all laboratories; - Students must have completed the theoretical part of the paper; - A maximum of 4 works can be recovered during the semester (30%);

	- The frequency at laboratory hours below 70% leads to the restoration of the discipline
6. Specific skills acquired	
Professional skills	CP3. Problem solving using Computer Science and engineering tools CP5. Design, life cycle management, integration and integrity of hardware, software and communications systems in order to increase the security of systems
Transversal skills	CT1. Applying, in the context of compliance with the law, intellectual property rights (including technology transfer), product certification methodology, principles, norms and values of the code of professional ethics within its own rigorous, efficient and responsible work strategy • Defining the basic managerial concepts necessary to implement a high security operating environment at the level of organizations • Development and implementation of process models of private cloud management. • Scientific substantiation of management decisions regarding the preservation and increase of process security as well as the implementation and monitoring of their effects within the organization CT2. Identify roles and responsibilities in a multi-specialized team decision-making and assigning tasks, with the application of relationship techniques and efficient work within the team • Assuming the specific roles and responsibilities of leading teams engaged in development activities for high security infrastructures / systems • Increasing the interest for the correct realization of a scientific research and for the pursuit of a career in research.

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ Familiarizing students with the defining elements for implementing and increasing the level of information security at the organizational level as well as identifying healthy strategies for institutional development in this regard
7.2 Specific objectives	• The course aims to familiarize with information security issues, with what data vulnerabilities represent, with the way in which the issue of protection of both unconnected and networked systems is raised. It aims to present the basic characteristics of information security issues and to develop the capabilities to develop the security policy as a whole in order to protect the information. • The laboratories are oriented towards the presentation in the first phase of the Security problems at the level of computer systems, after which the emphasis falls on the development of skills to use useful tools for scanning and identifying vulnerabilities, on the presentation of stages and how penetration tests are performed. of systems, as well as the protections that can be taken in this respect

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Information processing security, protection of values, Characteristics of computer intrusion, Attacks, Significance of computer security, Security purposes, Privacy, Integrity, Availability, Vulnerabilities - hardware, software, Data vulnerabilities, Computer offenders, Methods Defense, Controls, The Future in the Field 2. Protection of non-networked computers, User authentication, Password systems, Advantages of password systems, Disadvantage, Rules to increase	Free course presentation with video projector / overhead projector and blackboard in an interactive way: punctuate from time to time questions for students in order to increase the degree of interactivity	28 ore

the security provided by the password system, Encryption protection, Authentication based on encrypted keys, Authentication based on what the user is, Biometric authentication systems, Use of fingerprints in authentication 1. Access control: • Identification • Authentication Three factors • Single login • Single conviction • Access control with subjects and objects • Access control mode (DAC, non-DAC, MAC and RBAC) • Bell-LaPadula, Biba, Clark -Wilson, and Chinese Wall architecture • Identity management • Cloud computing 2. Advanced communication and network elements: Open Systems Interconnection (OSI) and Transmission Control Protocol / Internet Protocol (TCP / IP) models • Bus, star and token ring network configurations • Common protocols in TCP / IP suite • Ports used with common protocols • Different network architectures such as Internet, intranet, and extranet • Demilitarized zones (DMZ) • Wireless security protocols such as Wired Equivalent Privacy (WEP), Wi-Fi Protected Access (WPA) and WPA2 • Wireless technologies such as Bluetooth, RFID, 802.11, WiMax, GSM, 3G and NFC 3. Communication and network elements: • Telecommunication methods used to access the Internet • Securing the Voice over Internet Protocol (VoIP) with Secure Real-Time • Transport Protocol (SRTP) • Filtering packets, firewalls and firewalls application • Protects diversity with firewalls • Differentiates between network and host based firewalls • Risks and vulnerabilities related to remote access solutions • Different tunneling protocols using remote access • Authentication methods using remote access • Control network access 4. Differences between hackers and crackers • Differences between whitehats, blackhats, and grayhats • Denial-of-service and distributed denial-ofservice attacks • Zero-day exploits • Threats Advanced Persistence • Social Engineering Tactics • The Importance of Tools to Reduce Social Engineering Attacks 5. Code and Malware: Different types of viruses • Differences between viruses, worms, Trojans and logic bombs • Sets of roots, hatches, back doors and spyware • Differences between signature-based detection and heuristic-based detection • for antivirus software • The importance of keeping antivirus signature definitions up to date • Using spam filters and content filtering devices • The principle of least privilege and how it can help prevent infections • Educating users about practices 6. Malicious code and activity: • Different types of viruses • Differences between viruses, worms, Trojans and logic bombs • Root sets, hatches, backdoors and spyware • Differences between signature-based detection and detection-based of antivirus heuristics • The importance of keeping antivirus signature definitions up to date • Using spam filters and content filtering devices • The least privilege principle and how it can help prevent infections • Educating users about safe computer practices • Common vulnerabilities and exposures	• Indication of topics for documentation and individual study	

7. Risk, responses and recovery: • Definition of risk, threats, vulnerabilities and impact • Four main methods of risk management: mitigation (mitigation), avoidance, transfer and acceptance • Definition of residual risk • Steps used in risk assessment • Differences between analyzes quantitative and qualitative • Steps in response to the incident: preparation, detection, analysis, retention, eradication, • recovery and post-incident activities 8. Monitoring and analysis: • Security alert and false positive • Network-based and host-based intrusion detection systems • Intrusion prevention systems • Method of detection and prevention of attacks • File integration verifiers • Honeypots, plas honeycomb and lined cells • Event And Incident Managers, such as SIMs, System Event Managers (SEMs) and SIEMs • Types of vulnerability assessment tests • Tools		

Bibliography

1. Notite de curs (slide-uri) puse la dispozitie studentilor in format electronic pe platforma Office 365
2. Stallings W, Cryptography and Network Security Principles and Practice, Thhird Edition, Prentice Hall, 2003,
3. D.E.Popescu, Managementul securitatii informatiei, Editura Universitatii din Oradea, 2012
4. Computer Hacking, Security testing, Penetration testing and basic Security, Author: Cary hall & Erin Watson, Kindle edition, free, https://www.amazon.com/Hacking-Computer-Security-Testing-Penetration-ebook/dp/B01N1UPX8D
5. ITIL
1. 6 https://portswigger.net

8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
1. Presentation of laboratory activities, laboratories, labor protection rules and conventional signs specific to the field of information systems - general, general information on data protection and monitoring 2. Anonymity and Privacy, Darknet, darkweb 4. Network scanning tools and vulnerability scanning tools 5. Using NMAP for port scanning and vulnerability scanning (or Nessus alternative) 6-7. Use of Metaspoit facilities 8 SetUid programs 9-13 Using the Portswigger platform for exploiting web application vulnerabilities 14. Teaching laboratory works with knowledge verification	Students receive laboratory papers at least one week in advance, study them, inspect them, and take a theoretical test at the beginning of the laboratory. Then, the students carry out the practical part of the work under the guidance of the teacher.	2 hours are allocated for each of the 14 detailed points of the laboratory activity.

Bibliography

1. D.E.Popescu, Managementul securitatii informatiei, Editura Universitatii din Oradea, 2012
2. Modulul Moodle cu lucrarile de laborator
3. Webografie recomandata in cadrul orelor de proiect
4. Platforma Portswigger - https://portswigger.net
5. Metasploit: The Penetration Tester's Guide, Authors: David Kennedy, Jim O'Gorman, Devon Kearns, and Mati Aharoni, https://www.amazon.com/Metasploit-Penetration-Testers-David-Kennedy/dp/159327288X

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline is found in the curriculum of Computer and Information Technology specializations and other university centers that have accredited these specializations (Technical University of Cluj-Napoca, University of Craiova, "Politehnica" University of Timisoara, Gh. Asachi University of

Iasi, etc.), and knowledge of the architecture and organization of computer systems as well as their operation and design is a stringent requirement of employers in the field (Rds & Rcs, Plexus, Neologic, Celestica, Keysys, etc.).

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5) in accordance with the minimum performance standard: - it is necessary to know the fundamental notions required in the subjects, without presenting details on them For 10: - for grade 10, a thorough knowledge of all is required	The evaluation can be done face to face or online depending on the situation imposed	70%
10.6 Laboratory	- for mark 5 it is necessary to solve the corresponding number of requirements, depending on the test scale. - for mark 10, all requirements on the test sheet must be correctly resolved.	Tests during the semester The evaluation of students is done through two tests, taken during the semester. The arithmetic mean of the marks of these tests represents the mark with which they enter the exam. Students can also get extra points, depending on their participation in the laboratory and solving exercises with a higher degree of difficulty. These points can be used to calculate the test score.	30%
10.8 Minimum performance standard: Assimilation of detailed knowledge about vulnerabilities, risks and security solutions in managing and conveying information in a company The timely solution, in individual activities and activities carried out in groups, in conditions of qualified assistance, of the problems that require the application of principles and rules respecting the norms of professional deontology. Responsible assumption of specific tasks in multi-specialized teams and efficient communication at institutional level. • Development of team spirit, spirit of mutual help, awareness of the importance of training during the semester for good and sustainable results, awareness of the importance of research, own research related to learning (library, internet), cultivating a work discipline, done correctly and time			

Completion date:
25.09.2023

Date of endorsement in the department:
27.09.2023

Date of endorsement in the Faculty Board:

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Computers and Information Technology**
1.4 Field of study	**Computers and Information Technology**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Computers/ Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject		Architecture for Distributed Applications					
2.2 Holder of the subject		Assistant Professor dr. Otto Poszet					
2.3 Holder of the academic seminar/laboratory/project		Assistant Professor dr. Otto Poszet					
2.4 Year of study	IV	2.5 Semester	8	2.6 Type of the evaluation	Ex.	2.7 Subject regime	SD

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	0/2/0
3.4 Total of hours from the curriculum	56	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	0/28/0

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	16
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	12
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	12
Tutorials	0
Examinations	4
Other activities.	

3.7 Total of hours for individual study	**44**
3.9 Total of hours per semester	**100**
3.10 Number of credits	4

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions)
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	The course can be held face to face or online.
5.2.for the development of the academic seminary/laboratory/project	The laboratory can be carried out face to face or online
6. Specific skills acquired	

Professional skills	□ CP1 Operating with mathematical, engineering and computer science fundamentals. □ CP3 Problem solving using computer science and engineering tools.
Transversal skills	□ CT1. Honorable, responsible, ethical conduct in the spirit of the law to ensure the reputation of the profession. □ CT3. Demonstrating the spirit of initiative and action to update professional, economic and organizational culture knowledge.

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ The course aims to present the basics in the field of distributed systems and applications and to familiarize students with various aspects related to the design, implementation and use of distributed systems and applications.
7.2 Specific objectives	▪ After a classification of distributed computing systems, the course highlights the principles of design and implementation of these systems. The course also presents various methods to increase security and reliability in distributed systems. In each chapter, after the presentation of the theoretical principles, some concrete examples are studied. ▪ The laboratory aims to familiarize students with the technique of making distributed applications (concrete example - an electronic payment system) and proposes to make their own test programs, using the concepts learned in the course.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Introduction. Definition of a distributed system. Classification of distributed systems. Distributed operating systems - introduction, requirements. Distributed applications.	lecture / debate	2
2. Computer and inter-network networks. Communication between processes. Calling remote procedures.	lecture / debate	2
3. Distributed operating systems, file service, name service. Replication.	lecture / debate	2
4. Time and coordination. Transactions. Shared data. Distributed databases.	lecture / debate	2
5. Distributed applications. The architecture of a distributed application. Mainframe stage. Client / server model.	lecture / debate	2
6. Example of web architecture. The actors involved in such an architecture - browser, web server, DBMS, forms, scripts. Conducting the process. Client-side, server-side approach.	lecture / debate	2
7. Case study. CORBA (Common Object Request Broker Architecture). Java RMI (Remote Method Invocation). DCOM (MFC COM / OLE). ASP (Active Server Pages).	lecture / debate	2
8. Case study. Electronic payment systems. Classification. Security and reliability issues that occur in electronic payment systems. Presentation of security issues that occur in SEP.	lecture / debate	2
9. Participants of a SEP. Presentation of the three fundamental roles: buyer (customer), seller (electronic store), bank (TTP). The problem of identification.	lecture / debate	2
10. Case study. Offline electronic payment systems. Model of an offline SEP. Definition of an offline SEP. The general model of an offline SEP. Payment instrument. Electronic coins. Two-part format. Three-part format.	lecture / debate	2
11. Electronic offline payment systems. Payment and storage protocol. Checks. Offline payment protocol and storage protocol. Checks: currency validity, multiple deposits, multiple payments. Identifying dishonest people. Clearing.	lecture / debate	2

12. Case study. Online electronic payment systems Model of an online SEP. Advantages and disadvantages of an online SEP over an offline system. Participants, roles, transactions.	lecture / debate	2
13. Electronic online payment systems 2. Description of an online payment. Security and reliability issues. Electronic auction. Presentation of electronic auction systems. Security issues to be resolved in these systems. Possible solutions.	lecture / debate	2
14. Possible directions of development. Current trends. Completion of the course.	lecture / debate	2

Bibliography

1. George Coulouris, Jean Dollimore, Distributed Systems: Concepts and Design (5th Edition), Addison-Wesley, 2011, ISBN-10: 0132143011, ISBN-13: 978-0132143011
2. Wan Fokkink, Distributed Algorithms: An Intuitive Approach, The MIT Press, 2013, ISBN-10: 0262026775 ISBN-13: 978-0262026772
3. M.L. Liu, Solution Manual for Distributed Computing: Principles and Applications, California Polytechnic State University – San Luis Obispo, Addison-Wessley, 2003, ISBN-10: 0201796449 • ISBN-13: 9780201796445
4. https://computing.llnl.gov/tutorials/parallel_comp/
5. http://www.cnds.jhu.edu/courses/cs437/
6. http://www.open.edu/openlearn/science-maths-technology/computing-and-ict/information-and-communication-technologies/introduction-e-commerce-and-distributed-applications/content-section-0
7. Poszet Otto, „*Contributii la cresterea performantelor sistemelor de calcul distribuite privind corectitudinea si securitatea datelor*.”, Universitatea Tehnică din Cluj-Napoca, 2007
8. Vari Kakas Ş., Nagy A., Sisteme distribuite de calcul (note de curs şi laborator), 2004.
9. A. S. Tanenbaum, M. van Steen, Distributed Systems: Principles and Paradigms, Prentice Hall, 2001.
10. Stuart McClure, Joel Scambray, George Kurtz, “Securitatea reţelelor”, Editura Teora, 2007
11. Florin Radulescu, Ciprian Dobre, Programare web, Notiţe de curs, http://andrei.clubcisco.ro/cursuri/4pw/curs01.PDF
12. F. M. Boian, Programarea distribuită în Internet: metode şi aplicaţii, Ed. Albastră, Cluj-Napoca, 1998.
13. Victor-Valeriu Patriciu, Monica Ene-Pietroşanu, Călin Văduvă, Ion Bica, Nicolae Voicu, “Securitatea comerţului electronic”, Editura ALL, ISBN 973571325X, 2006

8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
1. Comparative study between distributed systems and centralized computing systems	Experimental study, practical activity	2
2. Communication between processes within distributed systems.	Experimental study, practical activity	2
3. URL (Uniform Resource Locator)	Experimental study, practical activity	2
4. RPC (Remote Procedure Call)	Experimental study, practical activity	2
5. RMI (Remote Method Invocation)	Experimental study, practical activity	2
6. Case study. Familiarizing students with electronic payment systems. Classification of electronic payment systems. Example.	Experimental study, practical activity	2
7. Virtual electronic store. Creating a virtual electronic store 1.	Experimental study, practical activity	2
8. Creating a virtual electronic store 2. Databases in the virtual electronic store. The back-end part.	Experimental study, practical activity	2
9. Creating a virtual electronic store 3. The front-end part.	Experimental study, practical activity	2
10. The mathematical apparatus used in SEP. Study of the mathematical apparatus used in SEP. Symmetric and asymmetric cryptosystems.	Experimental study, practical activity	2
11. Electronic offline payment systems. Mutual identifications. Coin generation. Implementation of the payment and storage protocol. Checks at the time of payment and subsequent checks. Identifying rogue users.	Experimental study, practical activity	2
12. Electronic online payment systems. Implementation of a virtual electronic store. Implementation of the bank. Online checks and online payment.	Experimental study, practical activity	2
13. Case study. Electronic auction systems.	Experimental study, practical activity	2
14. Evaluation of laboratory activity	Experimental study,	2

	practical activity	

Bibliography

1. George Coulouris, Jean Dollimore, Distributed Systems: Concepts and Design (5th Edition), Addison-Wesley, 2011, ISBN-10: 0132143011, ISBN-13: 978-0132143011
2. Wan Fokkink, Distributed Algorithms: An Intuitive Approach, The MIT Press, 2013, ISBN-10: 0262026775 ISBN-13: 978-0262026772
3. M.L. Liu, Solution Manual for Distributed Computing: Principles and Applications, California Polytechnic State University – San Luis Obispo, Addison-Wessley, 2003, ISBN-10: 0201796449 • ISBN-13: 9780201796445
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5. http://www.cnds.jhu.edu/courses/cs437/
6. http://www.open.edu/openlearn/science-maths-technology/computing-and-ict/information-and-communication-technologies/introduction-e-commerce-and-distributed-applications/content-section-0
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8. Vari Kakas Ș., Nagy A., Sisteme distribuite de calcul (note de curs și laborator), 2004.
9. A. S. Tanenbaum, M. van Steen, Distributed Systems: Principles and Paradigms, Prentice Hall, 2001.
10. Stuart McClure, Joel Scambray, George Kurtz, "Securitatea rețelelor", Editura Teora, 2007
11. Florin Radulescu, Ciprian Dobre, Programare web, Notiţe de curs, http://andrei.clubcisco.ro/cursuri/4pw/curs01.PDF
12. F. M. Boian, Programarea distribuită în Internet: metode și aplicaţii, Ed. Albastră, Cluj-Napoca, 1998.
13. Victor-Valeriu Patriciu, Monica Ene-Pietroșanu, Călin Văduvă, Ion Bica, Nicolae Voicu, "Securitatea comerţului electronic", Editura ALL, ISBN 973571325X, 2006

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

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10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard - For 10:	Exam. The evaluation can be done face to face or online.	75%
10.5 Academic seminar	Minimum required conditions for passing the examination (grade 5): in accordance with the minimum performance standard - For 10:	Reports. The evaluation can be done face to face or online.	25%
10.6 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard - For 10:		
10.7 Project			
10.8 Minimum performance standard: 50% Course: Academic seminar:			

Laboratory: Project:

Completion date:
25.09.2023

Signature of the course owner

Ş.L.Dr.Ing. Poszet Otto
poszet@uoradea.ro

Signature of the seminar/ laboratory/project owner
Ş.L.Dr.Ing. Poszet Otto
poszet@uoradea.ro

Date of endorsement in the department:
27.09.2023

Signature of Department Director
Conf. Dr. Ing. Alexandrina Mirela Pater
.....

Date of endorsement in the Faculty Board:
29.09.2023

Signature of Dean
Prof. Dr. Ing. Habil Francisc Ioan Hathazi
.....

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	Department of Computers and Information Technology
1.4 Field of study	Computers and Information Technology
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Computers / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject	Computer networks						
2.2 Holder of the subject	S.L. dr. ing. Florin Vancea						
2.3 Holder of the academic seminar/laboratory/project	S.L. dr. ing. Florin Vancea						
2.4 Year of study	IV	2.5 Semester	VII	2.6 Type of the evaluation	Ex	2.7 Subject regime	DD

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	2
3.4 Total of hours from the curriculum	56	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	28
Distribution of time					69 h
Study using the manual, course support, bibliography and handwritten notes					28
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					15
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					14
Tutorials					4
Examinations					8
Other activities.					

3.7 Total of hours for individual study	**69**
3.9 Total of hours per semester	**125**
3.10 Number of credits	**5**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions)
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	Video-projector, whiteboard or online platform. Course can be face-to-face or online.
5.2.for the development of the academic seminary/laboratory/project	Computer networks laboratory, with specific equipment or online resources. Seminary/laboratory/project can be face-to-face or online

6. Specific skills acquired	
Professional skills	▪ C2.1 description of the structure and functioning of the basic components of computer networks ▪ C2.2 explaining of the role, interaction and functioning of the computer networks components ▪ C2.3 building software components for network-based communication systems ▪ C2.4 evaluation of the functional and non-functional basic characteristics of computer networks ▪ C4.1 identification of the defining base elements for the performance of computer networks ▪ C4.2 explaining the interaction of the basic factors which determine the performance of computer networks ▪ C4.3 applying the basic methods and principles for increasing computer networks performance
Transversal skills	

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ To provide basic competence in computer networks
7.2 Specific objectives	▪ To know the computer networks structure ▪ To know the specific problems and solutions for computer networks ▪ To know usual and current technologies in the field ▪ To acquire abilities in diagnosing and configuring network components ▪ To acquire abilities in developing software systems which include network communication

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
Principles of machine-to-machine communication	Presentation, dialogue	2
Network types. Service types. Switching types.	Presentation, dialogue	2
Architectural models. ISO-OSI model – layers, primitives	Presentation, dialogue	2
TCP/IP model. UIT-T model	Presentation, dialogue	2
Physical layer – information POV, transmission types, coding techniques, media types	Presentation, dialogue	2
Physical layer – specific equipment, external resources available, PSTN, modulation/demodulation, multiplexing/demultiplexing.	Presentation, dialogue	2
Data link layer – functions, error protection, specific protocols, HDLC, PPP	Presentation, dialogue	2
Media access sublayer	Presentation, dialogue	2
LAN/MAN networks – transmission media, cabling, protocols, standards	Presentation, dialogue	2
Network layer – routing, congestion control	Presentation, dialogue	2
IP	Presentation, dialogue	2
Transport layer – service class, addressing, multiplexing, flow control	Presentation, dialogue	2
TCP/UDP	Presentation, dialogue	2

Application layer protocols	Presentation, dialogue	2
Bibliography A. S. Tannenbaum, Computer networks, Fourth Edition, Pearson 2002, ISBN-13: 9780130661029. F. Vancea Transmisii de date şi reţele de calculatoare – curs, Universitatea din Oradea, 1997		
8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
Introduction to laboratory equipment and network diagnose methods	Presentation, experiments	4
Copper-based LAN. Ethernet.	Presentation, experiments	4
Optical-based LAN	Presentation, experiments	4
UDP communication	Presentation, experiments	4
TCP communication	Presentation, experiments	4
LAN evaluation	Presentation, experiments	4
Application protocols	Presentation, experiments	4
Bibliography Laboratory guide, specific documentation		

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

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10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard - For 10:	Final written paper Evaluation can be face-to-face or online	70%
10.5 Academic seminar	Minimum required conditions for passing the examination (grade 5): in accordance with the minimum performance standard - For 10:	-	-
10.6 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard - For 10:	Continuous, during each activity. Evaluation can be face-to-face or online	30%
10.7 Project			
10.8 Minimum performance standard:			

Course: Academic seminar: Laboratory: Project:

Completion date: 26.09.2023

Date of endorsement in the department: 27.09.2023

Date of endorsement in the Faculty Board: 29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	Department of Computers and Information Technology
1.4 Field of study	Computers and Information Technology
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Computers / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject	Computer Network Design						
2.2 Holder of the subject	S.L. dr. ing. Florin Vancea						
2.3 Holder of the academic seminar/laboratory/project	S.L. dr. ing. Florin Vancea						
2.4 Year of study	IV	2.5 Semester	VIII	2.6 Type of the evaluation	Ex	2.7 Subject regime	SD

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	0/1/1
3.4 Total of hours from the curriculum	56	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	0/14/ 14
Distribution of time					69 hours
Study using the manual, course support, bibliography and handwritten notes					28
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					15
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					14
Tutorials					4
Examinations					8
Other activities.					

3.7 Total of hours for individual study	**69**
3.9 Total of hours per semester	**125**
3.10 Number of credits	5

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions) Computer Networks
4.2 related to skills	Skills from Computer Networks

5. Conditions (where applicable)

5.1. for the development of the course	Video-projector, whiteboard or online platform. Course can be face-to-face or online.
5.2.for the development of the academic seminary/laboratory/project	Computer networks laboratory, with specific equipment or online resources. Seminary/laboratory/project can be face-to-face or online

6. Specific skills acquired	
Professional skills	▪ C2.1 description of the structure and functioning of the components of computer networks ▪ C2.2 explaining the role, interaction and functioning of the computer networks with their connected systems ▪ C2.3 building and configuring software components for communication systems based on computer networks ▪ C2.4 evaluation of functional and non-functional characteristics of computer networks ▪ C2.5 (theoretical) implementation of computer networks ▪ C4.1 identification of the defining elements for computer networks performance ▪ C4.2 explaining the interaction between the factors which determine the performance of computer networks ▪ C4.3 applying design methods and principles to increase the performance of computer networks ▪ C4.4 choosing evaluation methods for the performance of computer networks ▪ C4.5 developing professional solutions for communication systems based on computer networks
Transversal skills	▪ CT2 team project development, role assuming, applied to computer networks

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ Providing advanced skills in computer networks, through design of entire solutions
7.2 Specific objectives	▪ Knowledge of design methodology ▪ Knowledge of specific problems and solutions in computer networks ▪ Knowledge of usual and current technology in the field ▪ Acquiring abilities in evaluation of computer networks performance ▪ Acquiring abilities in designing systems for computer networks

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
Requirements analysis	Presentation, dialogue	2
Technical targets analysis	Presentation, dialogue	2
Measurement and evaluation	Presentation, dialogue	2
Characterizing existing elements and initial traffic	Presentation, dialogue	2
Topology design	Presentation, dialogue	2
Naming and addressing models	Presentation, dialogue	2
Choosing routing and switching protocols	Presentation, dialogue	2
Strategies for securing the network	Presentation, dialogue	2
Strategies for network management	Presentation, dialogue	2
Choosing campus network technologies	Presentation, dialogue	2
Choosing enterprise network technologies	Presentation, dialogue	2
Methods for model testing	Presentation, dialogue	2
Methods for model optimization	Presentation, dialogue	2
Documenting the project	Presentation, dialogue	2
Bibliography P. Oppenheimer, Top-down Network Design, Third Edition, Cisco Press 2010, ISBN-13: 9781587202834. F. Vancea Transmisii de date şi reţele de calculatoare – curs, Universitatea din Oradea, 1997		
8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
Tools for traffic measurement	Presentation, experiment	2
Tools for management of network elements	Presentation, experiment	2
Protocol simulation tools	Presentation, experiment	4
Performance simulation tools	Presentation, experiment	6
Project preparation	Presentation, discussion,	14

	individual work	
Bibliography 1.		

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

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10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard - For 10:	Final written paper Evaluation can be face-to-face or online	60%
10.5 Academic seminar	Minimum required conditions for passing the examination (grade 5): in accordance with the minimum performance standard - For 10:	-	-
10.6 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard - For 10:	Continuous, during each activity. Evaluation can be face-to-face or online	20%
10.7 Project	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard - For 10:	Final, oral presentation and project document. Evaluation can be face-to-face or online	20%
10.8 Minimum performance standard: Course: Academic seminar: Laboratory: Project:			

Completion date: 26.09.2023

Date of endorsement in the department: 27.09.2023

Date of endorsement in the Faculty Board: 29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Computers and Information Technology**
1.4 Field of study	**Computers and Information Technology**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Computers/ Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject		Data Acquisition and Processing Systems					
2.2 Holder of the subject		Assistant Professor dr. Otto Poszet					
2.3 Holder of the academic seminar/laboratory/project		Assistant Professor dr. Otto Poszet					
2.4 Year of study	IV	2.5 Semester	8	2.6 Type of the evaluation	Ex.	2.7 Subject regime	SD

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	0/2/0
3.4 Total of hours from the curriculum	56	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	0/28/0

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	16
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	12
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	12
Tutorials	0
Examinations	4
Other activities.	

3.7 Total of hours for individual study	**44**
3.9 Total of hours per semester	**100**
3.10 Number of credits	**4**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions)
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	The course can be held face to face or online.
5.2.for the development of the academic seminary/laboratory/project	The laboratory can be carried out face to face or online

6. Specific skills acquired

Professional skills	□ CP2 Design of hardware, software and communications components. □ CP3 Problem solving using computer science and engineering tools.
Transversal skills	□ CT1. Honorable, responsible, ethical conduct in the spirit of the law to ensure the reputation of the profession. □ CT3. Demonstrating the spirit of initiative and action to update professional, economic and organizational culture knowledge.

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	The course aims to present the basics and familiarize students with the technique of data acquisition and process control with a special focus on hardware and highlighting the principles found in most industrial procurement systems.
7.2 Specific objectives	In each chapter, after the presentation of the theoretical principles, concrete examples of realization are studied (National Instruments acquisition plates). The laboratory aims to familiarize students with the technique of data acquisition and control (hardware and software) and to develop their own data acquisition programs for the LABPC + and myDAQ data acquisition board (National Instruments), using the notions learned in the course.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Definition of a data acquisition and control system. Introductory notions, definition of an DAQS, block diagram, data acquisition terminology	lecture / debate	2
2. Signal conditioning circuits 1. Passive conditioning circuits, dividers, bridges, filters	lecture / debate	2
3. Signal conditioning circuits 2. Active conditioning circuits, instrumental operational amplifiers	lecture / debate	2
4. Binary encodings of numbers. Defining numerical codes used in acquisition and control systems	lecture / debate	2
5. Digital-to-analog converters 1. Characteristic quantities	lecture / debate	2
6. Digital-to-analog converters 2. Construction principles of DAC, DAC for unipolar codes	lecture / debate	2
7. Digital-to-analog converters 3. DAC for bipolar codes, Voltage-frequency converters	lecture / debate	2
8. Analog-to-digital converters 1. Characteristics, ADC with parallel type comparison	lecture / debate	2
9. Analog-to-digital converters 2. ADC with serial-parallel comparison, ADC with serial comparison, ADC with integration	lecture / debate	2
10. Sampling and hold circuits 1. SH characteristics, Construction principles	lecture / debate	2
11. Sampling and hold circuits 2. Control of a SH-DAC assembly	lecture / debate	2
12. Mono and multi-channel data acquisition systems. Construction and control of DAQS single channel, multi-channel. Different types.	lecture / debate	2
13. Mono and multi-channel data distribution systems. Construction and control of single-channel, multi-channel DDS. Different types.	lecture / debate	2
14. LabPC+ and myDAQ data acquisition boards. Data acquisition board structure, features, operating modes.	lecture / debate	2

Bibliography

1. http://www.didatec.ro/sites/uo/
/sistemedeachizi%C5%A3ie%C5%9Fideprelucrareadatelor63508220536837 3861/default.aspx
2. Biswajit Ray, “An Instrumentation and Data Acquisition Course for Electronics Engineering Technology Students”,

Dept. of Physics & Engineering Technology, Bloomsburg University of Pennsylvania, Bloomsburg, PA 17815, http://www.ni.com/pdf/academic/us/journals/An_Instrumentation.pdf
3. http://physweb.bgu.ac.il/COURSES/SignalNoise/data_aquisition_fundamental.pdf
4. Vetterli, „Foundations of Signal Processing", 31/07/2014, ISBN 13 – 9781107038608
5. Theodoridis, „Image and Video Compression and Multimedia", Academic Press Library in Signal Processing, Volume 5, 29/05/2014, ISBN-13: 9780124201491
6. Giannakopoulos and Pikrakis, „Introduction to Audio Analysis, A MATLAB® Approach", 26/02/2014, ISBN-13: 9780080993881,
7. M. Muț, O. Poszet, "Sisteme de achiziție și control", Îndrumător de laborator, Universitatea din Oradea, 1995, Updated in 2021, e.uoradea.ro
8. Marinela Muț, "Sisteme de achiziție și control", Universitatea din Oradea, 2000, Updated in 2021, e.uoradea.ro
9. M.Muț, O. Poszet, "Sisteme de achiziție și control", Îndrumător de proiectare, Universitatea din Oradea, 1995
10. Veljko Potkonjak, Michael Gardner, Victor Callaghan, Pasi Mattila, Christian Guetl, Vladimir M. Petrovic, Kosta Jovanovic, „Virtual laboratories for education in science, technology, and engineering: A review", Computers & Education, Vol. 95, Issue C, pp. 309-327, April 2016.
11. Peter Tiernan, „Enhancing the learning experience of undergraduate technology students with LabVIEW software", Computers & Education, Vol. 55, Issue 4, pp. 1579-1588, December 2010.
12. Xie Bing, Chen Chang-xin, Zheng Bin, „Design of Data Acquisition and Signal Processing System Based on LabVIEW", Modern Electronics Technique, Issue 14, pp. 173-175, 2011.
13. Wei Zhan, Jay R. Porter, Joseph A. Morgan, „Experiential Learning of Digital Communication Using LabVIEW", IEEE Transactions on Education, Vol. 57, No. 1, pp. 34-41, February 2014
14. Gilbert-Rainer Gillich, Doina Frunzaverde, Nicoleta Gillich, Daniel Amariei, „The use of virtual instruments in engineering education", WCES-2010, Procedia Social and Behavioral Sciences, Vol. 2, Issue 2, pp. 3806-3810, 2010.
15. Linggang Liu, Junhui Li, Luhua Deng, „Design of Data Acquisition System Based on LabVIEW", Advanced Materials Research, Vol. 569, pp. 808-813, 2012.
16. Hong min Wang , Dan dan Li, Ping Xue, Jie Zhu, Hai bo Li, „LabVIEW-based data acquisition system design", IEEE 2012 International Conference on Measurement, Information and Control (MIC), pp. 689-692, May 18-20, 2012.

8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
1. Introduction to Data Acquisition Systems. Organizational problems. LabPC + and myDAQ acquisition boards.	Experimental study, practical activity	2
2. LabPC+ data acquisition board. Block diagram. Front panel. Exercises. The DaqWare utility.	Experimental study, practical activity	2
3. LabPC+ data acquisition board. Study of the generation of analog signals in static and dynamic regime. Measurements. User functions for generating analog signals. Board programming. Single-channel and multichannel applications, static and dynamic mode.	Experimental study, practical activity	2
4. LabPC + data acquisition board. The study of data acquisition in static and dynamic regime. Single-channel and multi-channel acquisition. Study of digital inputs/outputs and counting/timing circuits. Measurements. Board programming.	Experimental study, practical activity	2
5. NI myDAQ data acquisition board. Hardware architecture. Configuring and testing the board in the MAX Test Panel. NI ELVIS tools. Static measurements. DMM digital multimeter. Digital Reader and Writer.	Experimental study, practical activity	2
6. NI myDAQ data acquisition board. NI ELVIS tools. Dynamic measurements. Function generator, virtual oscilloscope, spectral analyzer, Bode analyzer, Arbitrary WFM Generator.	Experimental study, practical activity	2
7. The LabView programming environment. Introduction to LabView. Install LabView Student Edition. Block Diagram and Front Panel. Exercises: generation, visualization of waveforms. Daq Assistant.	Experimental study, practical activity	2
8. The LabView programming environment. Boolean type and numeric type. Polymorphism. Exercises. Solving the equation of degree 2 in 3 variants: classical, formula node, polynomial.	Experimental study, practical activity	2
9. The LabView programming environment. Character type, string, array (numeric, string). Exercises: operations with these types of data, sorting alphabetically.	Experimental study, practical activity	2
10. The LabView programming environment. Array type - complex mathematical operations, matrix multiplication, determinant, inverse matrix. Cluster type. Programming structures: IF, CASE, WHILE, FOR. Exercises. Generation of signals of different waveforms.	Experimental study, practical activity	2

11. The LabView programming environment. Signal processing in LabView. Spectral analysis. Using the computer sound card as a data acquisition board. Generation and processing of audio signals. Musical notes.	Experimental study, practical activity	2
12. The LabView programming environment. Exercises. Presentation of applications developed by students 1. Examples: processing audio signals, using precalculated frequency tables, timed loops.	Experimental study, practical activity	2
13. The LabView programming environment. Exercises. Presentation of applications developed by students 2. Examples: 2D and 3D graphics in LabView. 2D robotic arm, 3D animation of the solar system.	Experimental study, practical activity	2
14. The LabView programming environment. Exercises. Presentation of applications developed by students 3. Verification and conclusion of the situation in the laboratory.	Experimental study, practical activity	2

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1. http://www.didatec.ro/sites/uo/
/sistemedeachizi%C5%A3ie%C5%9Fideprelucrareadatelor63508220536837386l/default.aspx
2. Biswajit Ray, "An Instrumentation and Data Acquisition Course for Electronics Engineering Technology Students", Dept. of Physics & Engineering Technology, Bloomsburg University of Pennsylvania, Bloomsburg, PA 17815, http://www.ni.com/pdf/academic/us/journals/An_Instrumentation.pdf
3. http://physweb.bgu.ac.il/COURSES/SignalNoise/data_aquisition_fundamental.pdf
4. Vetterli, „Foundations of Signal Processing", 31/07/2014, ISBN 13 – 9781107038608
5. Theodoridis, „Image and Video Compression and Multimedia", Academic Press Library in Signal Processing, Volume 5, 29/05/2014, ISBN-13: 9780124201491
6. Giannakopoulos and Pikrakis, „Introduction to Audio Analysis, A MATLAB® Approach", 26/02/2014, ISBN-13: 9780080993881,
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8. Marinela Muț, "Sisteme de achiziție și control", Universitatea din Oradea, 2000, Updated in 2021, e.uoradea.ro
9. M.Muţ, O. Poszet, "Sisteme de achiziţie şi control", Îndrumător de proiectare, Universitatea din Oradea, 1995
10. Veljko Potkonjak, Michael Gardner, Victor Callaghan, Pasi Mattila, Christian Guetl, Vladimir M. Petrovic, Kosta Jovanovic, „Virtual laboratories for education in science, technology, and engineering: A review", Computers & Education, Vol. 95, Issue C, pp. 309-327, April 2016.
11. Peter Tiernan, „Enhancing the learning experience of undergraduate technology students with LabVIEW software", Computers & Education, Vol. 55, Issue 4, pp. 1579-1588, December 2010.
12. Xie Bing, Chen Chang-xin, Zheng Bin, „Design of Data Acquisition and Signal Processing System Based on LabVIEW", Modern Electronics Technique, Issue 14, pp. 173-175, 2011.
13. Wei Zhan, Jay R. Porter, Joseph A. Morgan, „Experiential Learning of Digital Communication Using LabVIEW", IEEE Transactions on Education, Vol. 57, No. 1, pp. 34-41, February 2014
14. Gilbert-Rainer Gillich, Doina Frunzaverde, Nicoleta Gillich, Daniel Amariei, „The use of virtual instruments in engineering education", WCES-2010, Procedia Social and Behavioral Sciences, Vol. 2, Issue 2, pp. 3806-3810, 2010.
15. Linggang Liu, Junhui Li, Luhua Deng, „Design of Data Acquisition System Based on LabVIEW", Advanced Materials Research, Vol. 569, pp. 808-813, 2012.
16. Hong min Wang , Dan dan Li, Ping Xue, Jie Zhu, Hai bo Li, „LabVIEW-based data acquisition system design", IEEE 2012 International Conference on Measurement, Information and Control (MIC), pp. 689-692, May 18-20, 2012.

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

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10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard - For 10:	Exam. The evaluation can be done face to face or online.	75%

10.5 Academic seminar	Minimum required conditions for passing the examination (grade 5): in accordance with the minimum performance standard - For 10:		
10.6 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard - For 10:	Reports. The evaluation can be done face to face or online.	25%
10.7 Project			
10.8 Minimum performance standard: 50% Course: Academic seminar: Laboratory: Project:			

Completion date:
25.09.2023

Signature of the course owner

Ș.L.Dr.Ing. Poszet Otto
poszet@uoradea.ro

Signature of the seminar/ laboratory/project owner
Ș.L.Dr.Ing. Poszet Otto
poszet@uoradea.ro

Date of endorsement in the department:
27.09.2023

Signature of Department Director
Conf. Dr. Ing. Alexandrina Mirela Pater
.....

Date of endorsement in the Faculty Board:
29.09.2023

Signature of Dean
Prof. Dr. Ing. Habil Francisc Ioan Hathazi
.....

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**1) Computers and information technology**
1.4 Field of study	**2) Computers and information technology**
1.5 Study cycle	**3) Bachelor**
1.6 Study program/Qualification	**4) / 5) Computers**

2. Data related to the subject

2.1 Name of the subject			**[6] Data security**				
2.2 Holder of the subject			S.l.dr.inf. MEDA VIORICA TODOR				
2.3 Holder of the academic seminar/laboratory/project			S.l.dr.ing. GEORGE PECHERLE				
2.4 Year of study	IV	2.5 Semester	7	2.6 Type of the evaluation	[7] Ex	2.7 Subject regime	[8] SD

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	0/1/1
3.4 Total of hours from the curriculum	56	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	0/14/14
Distribution of time					hours
Study using the manual, course support, bibliography and handwritten notes					40
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					20
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					20
Tutorials					4
Examinations					8
Other activities.					

3.7 Total of hours for individual study	**92**
3.9 Total of hours per semester	**148**
3.10 Number of credits	**4**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions)
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	Classroom equipped with video projector - Attendance at least 50% of the courses

5.2.for the development of the academic seminary/laboratory/project	Room equipped with computers and specific programs - Mandatory attendance at all laboratories; - A maximum of 3 works can be recovered during the semester (20%); The frequency of laboratory hours below 80% leads to the restoration of the discipline
6. Specific skills acquired	
Professional skills	C5 - Design, life cycle management, integration and integrity of software systems. • Specifying the relevant criteria regarding the life cycle, quality, safety and interaction of the computer system with the environment and with the human operator • The use of interdisciplinary knowledge for the adaptation of the computer system in relation to the requirements of the field of applications
Transversal skills	CT2. Identification, description and development of projects in project management, taking over the different roles in the team and clear and concise description, verbally and in writing, in Romanian and in an international language, of the results in the field of activity • Familiarization with the roles and activities specific to teamwork and distribution of tasks for subordinate levels

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	• Study of information protection techniques specific to network computing with special emphasis on cryptographic methods. • Most classical cryptographic techniques, block, flow, public key encryption algorithms and electronic signatures and certificates are studied. • The aim is to better understand the algorithms, the effective implementation of the most important algorithms used in any specific technology: object-oriented programming and the design of dedicated chips or the programming of microcontrollers
7.2 Specific objectives	• Adequate use of quality, safety and security standards in information processing • Carrying out a small and medium-sized project including identifying and analyzing the problem, designing, developing and demonstrating an understanding of the need for quality • Carrying out projects in a team, assuming different roles • After passing the course students will be able to: apply encryption algorithms, implement encryption algorithms in various programming languages, apply security measures on the Internet, analyze viruses and apply protection methods

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
Chapter 1. Security and integrity.	Presentation, free discussions	2
Chapter 2. About keys and key security.	Presentation, free discussions	2
Chapter 3. Character sets and cryptography.	Presentation, free discussions	2
Chapter 4. Linear substitution.	Presentation, free discussions	2
Chapter 5. Elementary cryptanalysis.	Presentation, free discussions	2
Chapter 6. Polyalphabetic substitution.	Presentation, free discussions	2
Chapter 7. Prime numbers and their importance in cryptography.	Presentation, free discussions	2
Chapter 8. DES.	Presentation, free discussions	2
Chapter 9. IDEA.	Presentation, free discussions	2
Chapter 10. The RSA algorithm.	Presentation, free discussions	2
Chapter 11. ESA candidates.	Presentation, free discussions	2
Chapter 12. INTERNET security.	Presentation, free discussions and report	4
Chapter 13. Viruses and virus protection.	Presentation, free discussions.	2
	Presentation, free discussions.	2
Bibliography		

1. Applied cryptography - Bruce Schneier, Editura John Wiley & Sons, Inc, 0-471-12845-7, 1997
2. Introduction to Cryptology and PC security - Brian Beckett, Editura Mc Graw Hill, ISBN-13: 9780077092351, 1997
3. Computer security basics. - Deborah Russel and G.T. Gangemi Sr, Editura O'Reilly & Assoc, 0-937175-71-4, 1993
4. Java Cryptography - Jonathan Knudsen, Editura O'Reilly, ISBN 10: 1-56592-402-9, 1998
5. Introducere în tehnica securităţii datelor - Mang Ioan, Editura Universităţii din Oradea, ISBN 973-9416-44, 1999
6. Probleme de securitate a datelor - Ioan Mang, Editura Universităţii din Oradea, ISBN 978-606-10-0327-3, 2010

8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
Laboratory		
1. Polyalphabetic substitution	Introductory lecture; free and individual discussions; implementation of proposed programs.	2
2. Polygramic substitution.	Introductory lecture; free and individual discussions; implementation of proposed programs.	2
3. The DES standard	Introductory lecture; free and individual discussions; implementation of proposed programs.	2
4. The IDEA system	Introductory lecture; free and individual discussions; implementation of proposed programs.	2
5. RSA figure.	Introductory lecture; free and individual discussions; implementation of proposed programs.	2
6. Merkle-Hellman cipher.		2
7. Viruses		2

Bibliografie:
1. Lucrări practice de tehnici de securitate a datelor - Mang Ioan, Mang Erica, Popescu C., Editura Universităţii din Oradea, 2002
2. Algoritmi moderni de criptare - Mang Ioan, Editura Universităţii din Oradea, ISBN 973-613-270 -6, 2002

8.4 Project		
Themes: Web application for encrypting / decrypting documents, using the AES algorithm Encrypted chat with AES algorithm Encrypted SMS sending application Web application for encrypting / decrypting documents, using the TripleDes algorithm Encrypted chat application using the AES algorithm	Discussions. Individually work and also in small groups of students.	14

Bibliografie:
1. Lucrări practice de tehnici de securitate a datelor - Mang Ioan, Mang Erica, Popescu C., Editura Universităţii din Oradea, 2002
2. Algoritmi moderni de criptare - Mang Ioan, Editura Universităţii din Oradea, ISBN 973-613-270 - 6, 2002
3. Applied cryptography - Bruce Schneier, Editura John Wiley & Sons, Inc, 0-471-12845-7, 1997
4. Introduction to Cryptology and PC security - Brian Beckett, Editura Mc Graw Hill, ISBN-13: 9780077092351, 1997
5. Computer security basics. - Deborah Russel and G.T. Gangemi Sr, Editura O'Reilly & Assoc, 0-937175-71-4, 1993
6. Java Cryptography - Jonathan Knudsen, Editura O'Reilly, ISBN 10: 1-56592-402-9, 1998
7. Introducere în tehnica securităţii datelor - Mang Ioan, Editura Universităţii din Oradea, ISBN 973-9416-44, 1999
8. Probleme de securitate a datelor - Ioan Mang, Editura Universităţii din Oradea, ISBN 978-606-10-0327-3, 2010

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline is adapted to the requirements of specialized companies.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard - For 10: the correct solving of all the subjects at the exam, the presence and activity at courses	Final course evaluation and problem solving.	60%
10.5 Academic seminar	Minimum required conditions for passing the examination (grade 5): in accordance with the minimum performance standard - For 10:		
10.6 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard Checking the theoretical preparation for the laboratory class and the way of accomplishing the proposed topics.	Weekly evaluation of the laboratory preparation Tracking the activity along the way, practical applications.	20%

	In order to participate in the exam, it is necessary to perform all the laboratory works and to obtain a grade of 5 for the activity carried out during the semester. - For 10: the presence and activity at laboratory		
10.7 Project	In order to obtain grade 5, the student will have to teach the project in written form, treating the proposed topic theoretically.	At the end of the semester, the project is taught and supported in front of colleagues. It follows the evolution during the semester, the support of the project, the way of writing.	20%
10.8 Minimum performance standard: Course: Academic seminar: Laboratory: Project: • To carry out projects respecting the ethical and responsible behavior; • Apply encryption algorithms • Implement encryption algorithms in various programming languages • To apply security measures on the internet • Analyze viruses and apply protection methods.			

Completion date:
September 27, 2023

Date of endorsement in the department:

September 27, 2023

Date of endorsement in the Faculty Board:

HELPFUL HINTS (*to be erased after completion*):

[1)] Choose one of the followings:
- Department of Control Systems Engineering and Management
- Department of Computers and Information Technology
- Department of Electrical Engineering
- Department of Electronics and Telecommunications

[2)] Choose one of the followings:
- Control systems engineering
- Computers and information technology
- Electrical engineering
- Electronical engineering, telecommunications and information technologies
- Engineering and management

[3)] Choose one of the followings:

- Bachelor (1st cycle)
- Master (2nd cycle)

4) Choose one of the followings:
A. Bachelor study programs:
- Applied Electronics
- Automatics and Applied Informatics
- Computers
- Economic Engineering in Electric, Electronic and Energetic Field
- Electrical Engineering and Computers
- Electrical Systems
- Electromechanics
- Electromechanics (at Beius)
- Information Technology
- Networks and Softwares for Telecommunications
B. Master study programs:
- Audio-Video Technologies and Telecommunications
- Advanced Systems in Electrical Engineering
- Management in Information Technology
- Advanced Control Systems
- Management and Communication in Engineering

5) Choose one of the followings:
- Bachelor of Engineering
- Master of Science in Engineering

6) According to the curriculum

7) Choose one of the followings, according to the curriculum:
- Ex. - Examination
- Cv. - Colloquium
- Vp - Continuous Assessment
- Pr - Project
- A/R- Passed/Failed

8) Choose one of the followings, according to the curriculum:
A. For Bachelor study programs:
- GD - General Discipline
- FD - Fundamental Discipline
- SD - Specialized Discipline
- CD - Complementary Discipline
- FD - Field Discipline
- DP - Practical Activities
- UO - University Choice
B. For Master study programs:
- THD - Thoroughgoing Disciplines
- SYD - Synthesis Disciplines
- AKD - Advanced Knowledge Disciplines
- UO - University Choice

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Computers and Information Technology**
1.4 Field of study	**Computers and Information Technology**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Computers / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject		**Distributed Systems**					
2.2 Holder of the subject		prof. dr. ing. Vari-Kakas Ştefan					
2.3 Holder of the academic seminar/laboratory/project		drd. ing. Cuc Adriana					
2.4 Year of study	4	2.5 Semester	2	2.6 Type of the evaluation	Vp	2.7 Subject regime	SD

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	3	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	0/1/0
3.4 Total of hours from the curriculum	42	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	0/14/0

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	28
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	3
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	21
Tutorials	3
Examinations	3
Other activities.	

3.7 Total of hours for individual study	58
3.9 Total of hours per semester	100
3.10 Number of credits	4

4. Pre-requisites (where applicable)

4.1 related to the curriculum	
4.2 related to skills	Computer networks, Java programming

5. Conditions (where applicable)

5.1. for the development of the course	The course can be conducted face to face with a projector or online.
5.2.for the development of the academic seminary/laboratory/project	The laboratory can be carried out face to face or online, using personal computers.

6. Specific skills acquired

Professional skills	▪ Design of hardware, software and communications components ▪ Design, life cycle management, integration and integrity of hardware, software and communication systems ▪ Design of intelligent systems ▪ Knowledge of the constructive principles of distributed computing systems ▪ Knowledge of the role and implementation of a name system and a file system ▪ Implementing an interprocess communication ▪ Design and implementation of a distributed application based on remote invocation ▪ Design and implementation of a distributed object-based application
Transversal skills	▪ Honorable, responsible, ethical behavior, in the spirit of the law to ensure the reputation of the profession ▪ Demonstrating the spirit of initiative and action to update professional knowledge

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ Knowledge of the basic principles of the operation of distributed computing systems
7.2 Specific objectives	▪ Description of basic methods and algorithms for distributed systems ▪ Description and implementation of distributed programs, of their specific functions ▪ Understanding how to achieve communication between processes ▪ Analysis and critical evaluation of some basic principles of distributed systems

8. Contents

8.1 Course	Teaching methods	No. of hours/ Observations
Characteristics of distributed systems	Lecture	2
Architectural models	Lecture	2
Networks and inter-networks	Lecture	2
Communication between processes	Lecture	2
Distributed objects and remote invocation	Lecture	2
Operating system support	Lecture	2
Distributed file systems	Lecture	2
Name services	Lecture	2
Time and coordination	Lecture	2
Global state and agreement	Lecture	2
Transactions and concurrency control	Lecture	2
Distributed transactions	Lecture	2
Replication	Lecture	2
Distributed multimedia systems	Lecture	2
Bibliography 1. Vari Kakas Ş., Sisteme distribuite de calcul (curs), 2012. 2. G. Coulouris, J. Dollimore, T. Kindberg, Distributed Systems: Concepts and Design, Addison-Wesley, 2011. 3. F. M. Boian, Programarea distribuită în Internet: metode şi aplicaţii, Ed. Albastră, Cluj-Napoca, 1998. 4. A. S. Tanenbaum, M. van Steen, Distributed Systems: Principles and Paradigms, Prentice Hall, 2006.		
8.2 Laboratory	Teaching methods	No. of hours/ Observations
Basic concepts. Client-server communication via UDP	Exemplification, analysis	2

Client-server communication via TCP	Exemplification, analysis	2
Encoding, framing and parsing data in messages	Exemplification, analysis	2
Remote Method Invocation	Exemplification, analysis	2
Multitasking, the use of threads	Exemplification, analysis	2
Multicast. Channels and selectors	Exemplification, analysis	2
Evaluation of laboratory activity	Presentation of reports, questions	2
Bibliography 1. Vari Kakas Ş., Sisteme distribuite de calcul (îndrumător de laborator), 2014. 2. K. L. Calvert, M. J. Donahoo, TCP/IP Sockets in Java, Morgan Kaufmann, 2008.		

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The discipline provides theoretical and practical knowledge directly applicable in the computer industry and in the field of information technology services.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard	Mid-term assessment.	90%
10.5 Academic seminar			
10.6 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard	Questions. Reports assessment.	Condition + 10%
10.7 Project			
10.8 Minimum performance standard: Course: Pass mark from 50% of the requirements met. Academic seminar: Laboratory: Pass. Project:			

Completion date:
26.09.2023

Date of endorsement in the department:
27.09.2023

Date of endorsement in the Faculty Board:
28.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Computers and Information Technology**
1.4 Field of study	**Computers and Information Technology**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Computers / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject		**Fault-Tolerant Systems**					
2.2 Holder of the subject		prof. dr. ing. Vari-Kakas Ştefan					
2.3 Holder of the academic seminar/laboratory/project		drd. ing. Cuc Adriana					
2.4 Year of study	4	2.5 Semester	1	2.6 Type of the evaluation	Ex.	2.7 Subject regime	SD

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	3	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	0/1/0
3.4 Total of hours from the curriculum	42	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	0/14/0

Distribution of time	hours
Study using the manual, course support, bibliography, and handwritten notes	36
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	4
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	14
Tutorials	2
Examinations	2
Other activities.	

3.7 Total of hours for individual study	58
3.9 Total of hours per semester	100
3.10 Number of credits	4

4. Pre-requisites (where applicable)

4.1 related to the curriculum	
4.2 related to skills	Computer architecture

5. Conditions (where applicable)

5.1. for the development of the course	The course can be conducted face to face with a projector or online.
5.2.for the development of the academic seminary/laboratory/project	The laboratory can be carried out face to face or online, using personal computers.

6. Specific skills acquired

Professional skills	▪ Design of hardware, software and communications components ▪ Improving the performance of hardware, software and communication systems ▪ Design and integration of information systems using technologies and programming environments ▪ Design of fault-tolerant building blocks ▪ Modeling computer systems for reliability calculations ▪ Evaluation of the reliability and availability of computer systems ▪ Implementing tolerance through informational, structural, temporal and software redundancy ▪ Comparative analysis of different solutions applied to the design of complex fault-tolerant computing systems
Transversal skills	▪ Honorable, responsible, ethical behavior, in the spirit of the law to ensure the reputation of the profession ▪ Demonstrating the spirit of initiative and action to update professional knowledge

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ Knowledge of concepts and methods related to the design of fault-tolerant computer systems, as well as to evaluate their reliability
7.2 Specific objectives	▪ Knowledge of the principles of fault tolerance depending on the type of redundancy ▪ Knowledge of indicators for evaluating the availability of a computer system ▪ Knowledge of the basic structure of tolerant systems based on static, dynamic and hybrid hardware redundancy ▪ Understanding the mode of action and use of error detection and correction codes ▪ Knowledge of redundant software structures and the principles of self-testing systems ▪ Knowledge of actions and how to implement recovery techniques from the error state

8. Contents

8.1 Course	Teaching methods	No. of hours/ Observations
Introduction	Lecture	2
Principles of fault tolerance	Lecture	2
Definition of reliability	Lecture	2
Predictive reliability of systems	Lecture	2
Repairable systems	Lecture	2
Reliability of programs	Lecture	2
Hardware redundancy	Lecture	2
Information redundancy	Lecture	2
Temporal redundancy	Lecture	2
Software redundancy	Lecture	2
Self-testing systems	Lecture	2
Error detection. Damage containment and assessment	Lecture	2
Error recovery	Lecture	2
Continuation of service	Lecture	2

Bibliography

1. Vari K. Ştefan, Sisteme tolerante la defecte, Editura Universităţii din Oradea, 2001.
2. Vari K. Ştefan, Evaluarea fiabilităţii sistemelor de calcul, Editura Universităţii din Oradea, 2002.
3. I. Koren, C. Mani Krishna, Fault-Tolerant Systems, Morgan Kaufmann, 2009.

4. Barry W. Johnson, Design and Analysis of Fault Tolerant Systems, Addison-Wesley, 1989. 5. Pankaj Jalote, Fault Tolerance in Distributed Systems, Prentice-Hall, 1994.		
8.2 Laboratory	Teaching methods	No. of hours/ Observations
Introduction. Fault tolerance and its applications.	Exemplification, debate, problem solving	2
Reliability. Reliability calculation using reliability block diagrams	Exemplification, debate, problem solving	2
Reliability analysis using Markov chains	Exemplification, debate, problem solving	2
Design techniques to ensure fault tolerance. Hardware redundancy	Exemplification, debate, problem solving	2
Ensuring fault tolerance. Information redundancy (I)	Exemplification, debate, problem solving	2
Ensuring fault tolerance. Information redundancy (II)	Exemplification, debate, problem solving	2
Evaluation of laboratory activity	Presentation of reports, questions	2
Bibliography 1. Vari K. Ştefan, Evaluarea fiabilităţii sistemelor de calcul, Editura Universităţii din Oradea, 2002. 2. Vari K. Ştefan, R. Ţirtea, Fascicole de lucrări de laborator, 2009. 3. Online simulators: http://www.ecs.umass.edu/ece/koren/FaultTolerantSystems/simulator/		

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The discipline provides theoretical and practical knowledge directly applicable in the computer industry and in the field of information technology services.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard	Written exam.	90%
10.5 Academic seminar			
10.6 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard	Reports assessment. Questions.	Condition + 10%
10.7 Project			
10.8 Minimum performance standard: Course: Pass mark from 50% of the requirements met. Academic seminar:			

Laboratory: Pass. Project:

Completion date:
26.09.2023

Date of endorsement in the department:
27.09.2023

Date of endorsement in the Faculty Board:
28.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	Department of Computers and Information Technology
1.4 Field of study	Computers and Information Technology
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	**COMPUTERS / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject		**Internet of Things**					
2.2 Holder of the subject		**As. Prof. PhD eng. Ovidiu-Constantin NOVAC**					
2.3 Holder of the academic seminar/laboratory/project		**As. Prof. PhD eng. Ovidiu-Constantin NOVAC**					
2.4 Year of study	**IV**	2.5 Semester	**7**	2.6 Type of the evaluation	**VP - Continuous Assessment**	2.7 Subject regime	**SD**

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**3**	of which: 3.2 course	**2**	3.3 academic seminar/laboratory	0/**1**
3.4 Total of hours from the curriculum	**42**	Of which: 3.5 course	**28**	3.6 academic seminar/laboratory	0/**14**/0
Distribution of time					**58** hours
Study using the manual, course support, bibliography and handwritten notes					20
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					12
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					20
Tutorials					-
Examinations					6
Other activities.					-

3.7 Total of hours for individual study	**58**
3.9 Total of hours per semester	**100**
3.10 Number of credits	**4**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	-
4.2 related to skills	-

5. Conditions (where applicable)

5.1. for the development of the course	The course can be held face-to-face or online. The course takes place with the modern techniques available: laptop, video projector, whiteboard or on specialized platforms for online courses (Moodle: e.uoradea.ro, Microsoft Teams).

5.2. for the development of the academic seminary/laboratory/project	The laboratory can be held face-to-face or online. The laboratory works are performed using the modern means of work existing in the laboratory: Personal computers, software programs, web browsers. Students presence to all laboratory hours is compulsory. Only one laboratory work can be recovered during the semester.

6. Specific skills acquired	
Professional skills	**C2. Designing hardware, software and communication components** **C5 Designing, lifecycle management, integration and integrity of hardware, software and communication systems**
Transversal skills	

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	The main goal is to familiarize students with the main methods of achieving connectivity and achieving advanced intelligent interactions between devices, systems and services. Creating applications that incorporate smart objects. Interconnecting these embedded devices (smart objects). The aim of the discipline is to provide students with a set of knowledge about the basic principles and techniques used in the production of IoT applications.
7.2 Specific objectives	After completing the "IoT" discipline, students acquire the following skills: • Knowledge of the areas of applicability of IoT. • Knowledge of the components of an IoT application. • Understanding and knowledge of programming languages and technologies used to make IoT applications. Knowledge of the interactivity and design elements necessary for IoT applications Acquiring the ability to use what they have learned in this discipline in the case of a rigorous and abstract approach to practical problems that may arise in further research (master's, doctorate).

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1 Introduction in Internet of Things (IoT).	Interactive lecture + video projector / Online	2
2. Smart objects used in IoT.	Interactive lecture + video projector / Online	2
3. Communication and cooperation in IoT	Interactive lecture + video projector / Online	2
4. Addressability and identification in IoT.	Interactive lecture + video projector / Online	2
5. Information processing encapsulated in IoT.	Interactive lecture + video projector / Online	2
6. User interfaces used in IoT.	Interactive lecture + video projector / Online	2
7. Programming languages used to develop IoT applications.	Interactive lecture + video projector / Online	2
8. IoT applications for Smart Home	Interactive lecture + video projector / Online	2

9. IoT applications for land transport	Interactive lecture + video projector / Online	2
10. IoT applications for medical systems and monitoring systems for the elderly	Interactive lecture + video projector / Online	2
11. IoT building applications. IoT applications for Smart Cities	Interactive lecture + video projector / Online	2
12. IoT applications for infrastructure management. IoT applications for energy management.	Interactive lecture + video projector / Online	2
13. Sensors. Generalities. Characteristics.	Interactive lecture + video projector / Online	2
14. Sensors. Types of sensors.	Interactive lecture + video projector / Online	2

Bibliography

1. Maciej Kranz, „Building the Internet of Things: Implement New Business Models, Disrupt Competitors, Transform Your Industry" ISBN: 978-1-119-28566-3, 272 pages, 2016.
2. https://en.wikipedia.org/wiki/Internet_of_Things
3. http://www.wall-street.ro/tag/internet-of-things.html
4. http://inventeaza.ro/stiri/internet-things-introducere
5. https://www.ibm.com/internet-of-things/resources/library/what-is-iot/
6. https://www.slideshare.net/MohanKumarG/internetofthings-iot-aseminar-ppt-by-mohankumarg?next_slideshow=1
7. https://e.uoradea.ro/course/view.php?id=7778 Materials (courses and laboratories)

8.2 Laboratory	Teaching methods	No. of hours/ Observations
1. Introduction. Overview of laboratory equipment used for IoT application development and labor protection.	Introductory lecture; free and individual discussions; implementation of proposed programs.	1
2. Presentation of some intelligent objects used in IoT.	Introductory lecture; free and individual discussions; implementation of proposed programs.	1
3. Programming languages used to develop IoT applications. Development of applications in Java.	Introductory lecture; free and individual discussions; implementation of proposed programs.	1
4. Programming languages used to develop IoT applications. Development of applications in Phyton	Introductory lecture; free and individual discussions; implementation of proposed programs.	1
5. Programming languages used to develop IoT applications. Development of Python applications for Raspberry Pi.	Introductory lecture; free and individual discussions; implementation of proposed programs.	1
6. Presentation of IoT applications for Smart Home	Introductory lecture; free and individual discussions; implementation of proposed programs.	1
7. Presentation of IoT applications for land transport	Introductory lecture; free and individual discussions; implementation of proposed programs.	1
8. Presentation of IoT applications for medical systems and elderly monitoring systems	Introductory lecture; free and individual discussions;	1

	implementation of proposed programs.	
9. Presentation of IoT applications for buildings (smart security applications, smart lighting applications)	Introductory lecture; free and individual discussions; implementation of proposed programs.	1
10. Presentation of IoT applications for buildings (smart alerts, applications for structural integrity)	Introductory lecture; free and individual discussions; implementation of proposed programs.	1
11. Presentation of IoT applications for Smart Cities (smart maintenance, surveillance applications)	Introductory lecture; free and individual discussions; implementation of proposed programs.	1
12. Presentation of IoT applications for smart cities (smart emergency services, utility applications, waste management)	Introductory lecture; free and individual discussions; implementation of proposed programs.	1
13. Presentation of IoT applications for energy management.	Introductory lecture; free and individual discussions; implementation of proposed programs.	1
14. Presentation of IoT applications for infrastructure management.	Introductory lecture; free and individual discussions; implementation of proposed programs.	1
Bibliografie 1.Maciej Kranz, „Building the Internet of Things: Implement New Business Models, Disrupt Competitors, Transform Your Industry" ISBN: 978-1-119-28566-3, 272 pages, 2016. 2. https://en.wikipedia.org/wiki/Internet_of_Things 3. http://www.wall-street.ro/tag/internet-of-things.html 4. http://inventeaza.ro/stiri/internet-things-introducere 5. https://www.ibm.com/internet-of-things/resources/library/what-is-iot/ 6. https://www.slideshare.net/MohanKumarG/internetofthings-iot-aseminar-ppt-by-mohankumarg?next_slideshow=1 7. https://e.uoradea.ro/course/view.php?id=7778 Materials (courses and laboratories)		
8.3 Seminar	Teaching methods	No. of hours/ Observations

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

The content of the subject is in accordance with the one in other national or international universities. In order to provide a better accomodation to the labour market requirements, there have been organized meetings both with representatives of the socio-economic environment and with academic staff with similar professional interest fields.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	The evaluation can be done face to face or online. Written or online exam.	Continuous Assessment, computer applications / Online assessment (Online questionnaire)	80 %
10.5 Seminar			

10.6 Laboratory	Laboratory report	Questions	Condition + 20%
10.7 Project			
10.8 Minimum performance standard: Knowledge of the basic notions of the treated subjects and its interconnections in a percentage of at least 50% for grade 5. Knowledge of basic notions, meanings, analytical relationships and solving IoT programs, 100%, for grade 10 (maximum grade).			

Completion date:
04.09.2023

Date of endorsement in the department:
27.09.2023

Date of endorsement in the Faculty Board:
29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Department of Computers and Information Technology**
1.4 Field of study	**Computers and Information Technology**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Computers / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject	**Multimedia Communication**						
2.2 Holder of the subject	**Lect.PhD. Mircea-Petru URSU**						
2.3 Holder of the academic seminar/laboratory/project	**Lect.PhD. Mircea-Petru URSU**						
2.4 Year of study	**IV**	2.5 Semester	**8**	2.6 Type of the evaluation	**Ex.**	2.7 Subject regime	**CD**

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**3**	of which: 3.2 course	**2**	3.3 academic seminar/laboratory/project	**1**
3.4 Total of hours from the curriculum	**42**	Of which: 3.5 course	**28**	3.6 academic seminar/laboratory/project	**14**

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	**14**
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	**8**
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	**5**
Tutorials	**2**
Examinations	**4**
Other activities.	

3.7 Total of hours for individual study	**33**
3.9 Total of hours per semester	**75**
3.10 Number of credits	**3**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions)
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	✓ Video projector and internet access in the amphitheater; ✓ Presence minimum 50% at the courses; ✓ The courses can be held face-to-face or online.

5.2.for the development of the academic seminary/ laboratory/ project	✓ Computers with adequate applications and internet access for each student at seminary; ✓ Compulsory presence at all seminaries; ✓ The final seminary grade under 5(five) implies discipline restoring; ✓ The seminaries can be held face-to-face or online.
6. Specific skills acquired	
Professional skills	
Transversal skills	**CT3.** Demonstrating the spirit of initiative and action to update professional, economic and organizational culture knowledge / 3 credits

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ Knowledge of current communication techniques and their application in professional relationships and situations. Use of oral and written communication techniques and electronic communication tools (online communication). Training teamwork skills.
7.2 Specific objectives	▪ acquiring oral, written, electronic and online communication skills; ▪ acquiring the skills to write a CV, a letter of intent / motivation, a technical report, a scientific paper or a poster, respectively a press release; ▪ acquiring and using teamwork skills; ▪ acquiring the skills to design, implement and use personal websites or blogs; ▪ acquiring the skills to write and implement a diploma project respecting the specific structural requirements.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
Science of communication – basics, means and techniques, objectives	Interactive verbal presentation, with video projector, with debates, arguments and examples for the topic of the course, with questions for students in order to increase their involvement	28
Communication – forms of communication, communication barriers and methods of overcoming them		
Communication skills – attitude, influences, trust, win-win model, empathic communication		
Oral communication – presentation – preparation and deliverance of an oral presentation, preparation of the speech, writing of the speech, preparation of the visual elements, the actual oral presentation		
Oral communication - interview - preparing, developing self-assessment grid, ensuring that no detail has been forgotten, ways to be the best interview		
Written communication – types of written documents, technical communication, writing a scientific article or poster		
Written communication – scientific paper – the structural requirements of a scientific paper and techniques for its writing, how to write and implement a scientific paper according to the specifications		
Electronic communication - use of e-mail and Internet - types of messages, e-mail etiquette, steps of writing an e-mail, common messages; *Fake-News* phenomenon, identification, counteraction		
Teamwork, dynamics, development – methods used for teamwork in order to achieve the specified objectives in competitive conditions		
Presentation of the requirements for writing and sustaining the diploma project		

<table>
<tr><td colspan="3">Bibliography
1. Gabor A.G., Ursu M.P., Ghid de comunicare în inginerie, Editura Universității din Oradea, 2017
2. J. Beaird, The Principles of Beautiful Web Design, Sitepoint, 2007
3. S. Buraga, Proiectarea siturilor Web (editia a II-a), Polirom, 2005
4. Gianina Gabor, Tehnici moderne de comunicare /curs/, Universitatea din Oradea, Departamentul pentru învățământ la distanță , Oradea, 2004
5. S. Prutianu, Antrenamentul abilităților de comunicare, Editura Polirom, Iași, 2004;
6. R. Hoff, Regulile unei prezentări de succes, Curtea Veche, 2002
7. Evelina Graur, Tehnici de comunicare, Editura Mediamira, Cluj, 2001 (http://www.eed.usv.ro/assets/fisiere/carti%20incot/Tehnici-de-comunicare.pdf)
8. N.Stanton, Communication, Macmillan Education, 1990;</td></tr>
<tr><td>8.2 Academic seminar/laboratory/project</td><td>Teaching methods</td><td>No. of hours/ Observations</td></tr>
<tr><td>1. Presentation of the discipline, its basics, the seminary themes and the requirements for promotion.
2. Improvised personal presentation.
3. Personal presentation with PowerPoint.
4. Presentation of a hobby.
5. Team presentation of a gadget.
6. Presentation of the diploma project.
7. Closing of the scholar situation.</td><td>➢ Presentation
➢ Discussions
➢ Oral debates
➢ Examples study
➢ Implementing the proposed applications</td><td>Two hours are assigned for each of the 7 detailed seminary tasks.</td></tr>
<tr><td colspan="3">Bibliography
1. Gabor A.G., Ursu M.P., Ghid de comunicare în inginerie, Editura Universității din Oradea, 2017
2. J. Beaird, The Principles of Beautiful Web Design, Sitepoint, 2007
3. S. Buraga, Proiectarea siturilor Web (editia a II-a), Polirom, 2005
4. Gianina Gabor, Tehnici moderne de comunicare /îndrumător de laborator/, Universitatea din Oradea, Departamentul pentru învațământ la distanță , Oradea, 2004
5. S. Prutianu, Antrenamentul abilităților de comunicare, Editura Polirom, Iași, 2004
6. R. Hoff, Regulile unei prezentari de succes, Curtea Veche, 2002
7. Evelina Graur, Tehnici de comunicare, Ed. Mediamira, Cluj, 2001 (http://www.eed.usv.ro/assets/fisiere/carti%20incot/Tehnici-de-comunicare.pdf)
8. N.Stanton, Communication, Macmillan Education, 1990;
9. IEEE, Professional Communication Society, http://www.ieeepcs.org</td></tr>
</table>

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- by mastering the theoretical-methodological concepts and approaching the practical aspects included in the discipline "Multimedia Communication", students acquire consistent knowledge, in accordance with the required skills
- this discipline is included in the curricula of the other universities and faculties of similar profiles in Romania

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard - For 10: correct answers to all questions and delivering a	Oral: testing of theoretical knowledge and its implementation in applied presentation ✓ The exam can be held face-to-face or online	60%

	presentation that meets all requirements		
10.5 Academic seminar	Minimum required conditions for passing the examination (grade 5): in accordance with the minimum performance standard - For 10: realization of all specified seminary tasks	Oral: assessment of the presentations / applications according to the requirements	40%
10.6 Laboratory	-	-	-
10.7 Project	-	-	-
10.8 Minimum performance standard: Course: assertion of some basic theoretical notions and supporting a presentation that respects them; Academic seminar: accomplishment of 50% of the specified requirements; Laboratory: - Project: - Grades of minimum 5(five) for the seminary activity and 5(five) for the exam result.			

Completion date: 01.09.2023

lect.PhD. Mircea-Petru URSU
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Date of endorsement in the department: 27.09.2023

Department Director
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Date of endorsement in the Faculty Board:

Dean:
prof.PhD.habil. Francisc Ioan HATHAZI
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SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	Department of Computers and Information Technology
1.4 Field of study	Computers and information technology
1.5 Study cycle	Bachelor (1st cycle)
1.6 Study program/Qualification	Computers / Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject				**Object-Oriented Applications Design**			
2.2 Holder of the subject				**Prof.univ.dr.ing. Zmaranda Doina**			
2.3 Holder of the academic seminar/laboratory/project				**Prof.univ.dr.ing. Zmaranda Doina**			
2.4 Year of study	**IV**	2.5 Semester	**7**	2.6 Type of the evaluation	**Ex**. - Examination	2.7 Subject regime	**SD** - Specialized Discipline

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	**4**	of which: 3.2 course	**2**	3.3 academic seminar/laboratory/project	**2**
3.4 Total of hours from the curriculum	**56**	Of which: 3.5 course	**28**	3.6 academic seminar/laboratory/project	**28**

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	14
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	8
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	14
Tutorials	2
Examinations	6
Other activities.	

3.7 Total of hours for individual study	**44**
3.9 Total of hours per semester	**100**
3.10 Number of credits	**4**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions)
4.2 related to skills	Knowledge of basic concepts of object-oriented programming

5. Conditions (where applicable)

5.1. for the development of the course	- the course can be held face to face (classroom equipped with computer and video projector) or online; slide-based presentation - attendance at least 50% of the course
5.2.for the development of the academic seminary/laboratory/project	- the laboratory can be held face to face (laboratory room equipped with computers and .NET platform / Visual Studio) or online - mandatory presence at all laboratories - a maximum of 4 laboratory works can be recovered during the semester (30%) - the frequency of laboratory hours below 70% leads to the re-done the discipline

6. Specific skills acquired	
Professional skills	**CP2.** Design of hardware, software and communications components **CP5**. Design, life cycle management, integration and integrity of hardware and communications systems
Transversal skills	

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ In the context of the diversity of existing software applications, with urgent performance needs, the course addresses specific aspects in the field of design and development of object-oriented applications
7.2 Specific objectives	The course aims to describe the theoretical concepts and principles together with design patterns that underlie the design of object-oriented applications development The laboratory familiarizes students with practical aspects of designing, modeling and implementing object-oriented applications using design patterns and a tool in the field of object analysis and design - UML (Unified Modeling Language). The implementations are based on.NET platform and C# language, without restricting the generality of the presented concepts

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
UML - Unified Modeling Language. UML Model and concepts.	Presentation of the course concepts and examples on slides, face to face or online	2
Structural and behavioral diagrams in UML model		2
Object oriented design with UML. Requirements specification. Object oriented analysis: analysis class diagrams development.		2
Object oriented design with UML. Use case and sequence diagram development. Refinement of the model and realization of design class diagrams. Organizing the model. Refactoring		2
SOLID design principles. Design patterns - concepts. Classification of design patterns. Applicability of design patterns. Benefits		2
Creational patterns: Singleton, Factory, AbstractFactory, Builder, Prototype.		2
Examples of creational patterns.		2
Structural patterns: Façade, Decorator, Adapter, Bridge, Composite, Flyweight, Proxy.		2
Examples of structural patterns.		2
Behavioral patterns: Visitor. State. Observer, Command, Strategy, Chain of Responsibility, Interpreter, Iterator, Mediator, Memento, Template.		4
Examples of behavioral patterns.		4
Architectural patterns: MVC (Model-View-Controller). Repository		2

Bibliography

1. D. Zmaranda - Proiectarea sistemelor orientate pe obiecte utilizând şabloane de proiectare, Editura Universităţii din Oradea,ISBN 978-606-10-0427-0, 332pg., 2011

2. D. Zaharie, D. Zmaranda - Dezvoltarea aplicaţiilor software utilizând platforma .NET, Editura ASE Bucureşti, ISBN 978-606-505-547-6, 506pg., 2012
3. Dathan, Brahma, Ramnath, Sarnath, Object-Oriented Analysis, Design and Implementation, An Integrated Approach, ISBN 978-3-319-24280-4, second edition, University Press, 2015
4. Gary Mclean, Adaptive Code via C#: Agile coding with design patterns and SOLID principles, ISBN-13 : 978-0735683204, Microsoft Press; 1st Edition, 2014
5. Dmitri Nesteruk, Design Patterns in .NET: Reusable Approaches in C# and F# for Object-Oriented Software Design, ISBN-13 : 978-1484243657, Apress; 1st ed. Edition, 2019
6. Jimmy Nilsson, Applying Domain-Driven Design and Patterns: With Examples in C# and .NET, Addison-Wesley, 2006
7. Martin Fowler, UML Distilled: A Brief Guide to the Standard Object Modeling Language (3nd Edition), Addison Wesley – Pearson Education, 2004
8. Craig Larman, Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development (3rd Edition) , Prentice Hall, 2004
9. https://uoradea-my.sharepoint.com/personal/rodica_zmaranda_didactic_uoradea_ro/_layouts/15/onedrive.aspx?isAscending=true&id=%2Fpersonal%2Frodica%5Fzmaranda%5Fdidactic%5Fuoradea%5Fro%2FDocuments%2FPAOO%2FCurs%5FPAOO&sortField=LinkFilename&view=0

8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
UML basic concepts. UML diagrams: structural and behavioral diagrams.	Students receive practical homework at least a week in advance, and study it. At the beginning of the laboratory, possible implementation solutions for the proposed applications are discussed. Afterwards, the students start implementations (the proposed problems from each laboratory) under the guidance of the teacher.	2
Case study: Library application. Object oriented analysis: discussions. Requirements specifications. Conceptual model development		2
Case study: Library application. Object oriented design: major subsystem identification, software classes identification and creation		4
Case study: Library application. Object oriented implementation: loosely coupling, generic code creation, Façade and Singleton pattern utilization		2
Case study: Library application. Extensibility of the solution: refactorization by using Decorator pattern		2
Finite State Modeling (Finite State Machine). Case study: controller for microwave. Concepts.		2
Case study: controller for microwave. Refactorization - State pattern.		4
Case study: controller for microwave. Refactorization - Observer pattern		2
Laboratory evaluations and final assessment		4

Bibliography

1. **D. Zmaranda** - Proiectarea sistemelor orientate pe obiecte utilizând şabloane de proiectare, Editura Universităţii din Oradea, ISBN 978-606-10-0427-0, 332pg., 2011
2. https://uoradea-my.sharepoint.com/personal/rodica_zmaranda_didactic_uoradea_ro/_layouts/15/onedrive.aspx?isAscending=true&id=%2Fpersonal%2Frodica%5Fzmaranda%5Fdidactic%5Fuoradea%5Fro%2FDocuments%2FPAOO%2FLaborator%5FPAOO&sortField=LinkFilename&view=0

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline is found in the curriculum of Computers specialization at Politehnica University of Timisoara. Knowledge of the basic concepts of object-oriented modeling and design patterns, presented within this discipline, represent an important requirement in order develop programming skills and abilities that were requested by software companies.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard: it is necessary to know the fundamental concepts required in the quiz, without presenting details on them For 10: correct answer and detailed knowledge to all the questions in the quiz is required	**Written exam** - the assessment can be done face to face or online Students receive for solving a quiz with 4-6 theory questions that tests the mastery of the theoretical concepts presented in the course.	40 %
10.6 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard: achieving a functional implementation in proportion of 50% of the applications proposed in the laboratory For 10, detailed knowledge of how to implement all laboratory problems and 100% functional implementation is required	**Practical application** - evaluation can be done face to face or online. At each laboratory, students are evaluated based on their activity (answers to questions, implementation proposals, etc.), evaluations that is finalized at the end of the laboratory by a mark for all activity during the semester.	60 %

10.8 Minimum performance standard:

Course:

- knowledge and understanding of the basic concepts that are specific to the modeling and design of an object-oriented application as well as the tools / languages used in the field of modeling and object- oriented design
- knowledge and understanding of the general structure of OOP applications and familiarization with design patterns specific to the field

Laboratory:

- acquiring practical skills and learning how to model, design and implement an object-oriented application: fundamental concepts, structuring applications as well as how to apply theoretical concepts in the development process of a concrete application
- practical utilization of modeling and design patterns

Completion date: 07.09.2023

Date of endorsement in the department: 27.09.2023

Date of endorsement in the Faculty Board

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**Computers and Information Technology**
1.4 Field of study	**Computers and information technology**
1.5 Study cycle	**Bachelor (1st cycle)**
1.6 Study program/Qualification	**Information Technology / Bachelor of Engineering**

2. Data related to the subject

2.1 Name of the subject		**Performance evaluation**					
2.2 Holder of the subject		Associate professor dr. Elisa Valentina MOISI					
2.3 Holder of the academic seminar/laboratory/project		Associate professor dr. Elisa Valentina MOISI					
2.4 Year of study	IV	2.5 Semester	7	2.6 Type of the evaluation	Vp - Continuous Assessment	2.7 Subject regime	SD - Specialized Discipline

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	2
3.4 Total of hours from the curriculum	56	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	28
Distribution of time					hours
Study using the manual, course support, bibliography and handwritten notes					16
Supplementary documentation using the library, on field-related electronic platforms and in field-related places					8
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays					14
Tutorials					2
Examinations					4
Other activities.					

3.7 Total of hours for individual study	**44**
3.9 Total of hours per semester	**100**
3.10 Number of credits	4

4. Pre-requisites (where applicable)

4.1 related to the curriculum	Computer architecture. Microprocessor systems.
4.2 related to skills	Programming logics, average language programming skills

5. Conditions (where applicable)

5.1. for the development of the course	Classroom with laptops and video projector The course can be held face-to-face or online.

5.2.for the development of the academic seminary/laboratory/project	Laboratory room equipped with networked computers, internet connection and adequate software The laboratory can be carried out face to face or online

6. Specific skills acquired

Professional skills	CP3. Solving problems using computer science and engineering instruments CP4. Improving performance of hardware, software and communication systems
Transversal skills	CT1. Honorable, responsible and ethical behavior, respecting the spirit of the law, to ensure the reputation of the profession. CT2. Identification, description and implementation of project management processes, by taking different team roles, together with a clear and concise verbal and written description, in Romanian and an international language , of the results of the activity CT3. Demonstration of initiative and action for updating professional, economic knowledge and organizational culture.

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ It aims to provide students with tools and methods for evaluating the performance of computer systems and software
7.2 Specific objectives	▪ The course aims to acquire by students knowledge specific to the performance of computer systems, both in terms of software and hardware, measurement techniques by measurement, analytical modeling and simulation. Analysis and presentation of data through statistical techniques. It also aims to present some aspects related to software performance.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Basic concepts and preliminaries. Theory of program testing 2. Unit testing 3. Control flow testing 4. Data flow testing 5. Domain testing 6. System integration 7. System test categories 8. Functional testing 9. Test generation from fsm models 10. System test design 11. System test planning and automation 12. System test execution 13. Acceptance testing 14. Software reliabilty	Presentation, description, explanations, examples, dialogue	28

Bibliography

Kshirasagar Naik, Priyadarshi Tripathy, Software Testing and Quality Assurance: Theory and Practice, John Wiley&Sons, 2011
Mauro Pezze and Michal Young., Software Testing and Analysis, 2008, John Wiley & Sons
Mohammad Obaidat, N. Boudriga- Fundamentals of Performance Evaluation of Computer and Telecommunication Systems, John Wiley&Sons, 2010
Cursul - Software Quality and Testing - Greg Gay, https://greg4cr.github.io/courses/spring22dit635/index.html

Information Systems Today: Managing the Digital World, Joseph S Valacich, Christoph Schneider, Matthew Hashim, Published by Pearson (May 10th 2021)		
8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
Agile Planning and Portfolio Management with Azure Boards Version Controlling with Azure Repos Configuring pipelines as Code with YAML Embracing Continuous Delivery with Azure Pipelines Collaborating with Azure DevOps Wiki Exploratory Testing with Azure Test Plans Monitoring App Performance with Application Insights Managing Project Schedules across Teams with Delivery Plans Working with Pull Requests in VS Code and Azure DevOps Enabling Continuous Integration with Azure Pipelines Package Management with Azure Artifacts Test Planning and Management with Azure Test Plans Web Application Load and Performance Testing Working with Pull Requests in VS Code and GitHub	Participatory laboratory, students writing code, group work, dialogue, demonstration, questions, functionality testing	28
Bibliography Test-Driven Development with Python, 2nd Edition, by Harry Percival, Released August 2017, Publisher(s): O'Reilly Media, Inc., ISBN: 9781491958704 Kshirasagar Naik, Priyadarshi Tripathy, Software Testing and Quality Assurance: Theory and Practice, John Wiley&Sons, 2011 Mauro Pezze and Michal Young., Software Testing and Analysis, 2008, John Wiley & Sons Azure DevOps Learning Path - https://azuredevopslabs.com/		

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline is consistent with what is done in other university centers abroad.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard	Written paper	50%
10.5 Academic seminar			
10.6 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard	- Laboratory / practical works - Tests during the semester	50%
10.7 Project			
10.8 Minimum performance standard: Course: 1. To solve well a minimum of topics -questions and applications 2. Minimum grade 5 in the laboratory Academic seminar: - Laboratory: 1. The student knows the main concepts, recognizes them, defines them correctly and builds a simple application; 2. The programming language is used correctly;			

3. To solve well a minimum of topics -questions and applications

Project: -

Completion date: 15.09.2023

Date of endorsement in the department: 27.09.2023

Date of endorsement in the Faculty Board: 29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	Department of Computers and Information Technology
1.4 Field of study	Computers and Information Technology
1.5 Study cycle	Bachelor
1.6 Study program/Qualification	Computers/ Bachelor of Engineering

2. Data related to the subject

2.1 Name of the subject		**Pattern Recognition Systems**					
2.2 Holder of the subject		Prof. dr. ing. Gyorodi Robert Stefan					
2.3 Holder of the academic seminar/laboratory/project		Conf. Dr. ing. Buciu Ioan					
2.4 Year of study	IV	2.5 Semester	2	2.6 Type of the evaluation	Vp	2.7 Subject regime	SD

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	0/2/0
3.4 Total of hours from the curriculum	56	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	0/28/0

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	18
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	10
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	8
Tutorials	4
Examinations	4
Other activities.	

3.7 Total of hours for individual study	**44**
3.9 Total of hours per semester	**100**
3.10 Number of credits	4

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions) Computer programming and programming languages I Computer programming and programming languages II
4.2 related to skills	Structured programming in the C language/ C ++ / Java object-oriented

5. Conditions (where applicable)

5.1. for the development of the course	Classroom equipped with video projector and computer. The course can be held face to face or online
5.2.for the development of the academic seminary/laboratory/project	Laboratory equipped with video projector and computers that are connected to the internet. They have installed Visual Studio, Eclipse for

	Java, SQL Business Intelligence Development Studio, Rapid Miner, Knime, Python, JetBrains PyCharm Edu Professional. The laboratory can take place face to face or online
6. Specific skills acquired	
Professional skills	C5. Designing, lifecycle management, integration and integrity of hardware, software and communication systems C6. Designing intelligent systems
Transversal skills	

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ Acquiring the concepts that underlie the design and implementation of systems for recognizing patterns and discovering knowledge.
7.2 Specific objectives	▪ The course presents the concepts of patterns recognition theory, the characteristics of a general shape recognition system, the general principles of shape recognition techniques, classification methods based on optimizing a criterion function, neural networks, deep neural networks, discovering knowledge from large databases, classification based on the decision trees, decision rules, discovery of association rules, advanced concepts such as the discovery of knowledge on the web, spatial and temporal.

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
1. Fundamental concepts of pattern recognition theory	Powerpoint presentation with the help of the video projector; free discussions;	2 hours
2. General principles of pattern recognition techniques		2 hours
3. Classification methods based on the optimization of a criterion function		2 hours
4. Class separation criteria. (discriminant analysis)		2 hours
5. Discovering knowledge		2 hours
6. Data Mining Techniques		2 hours
7. Statistical Algorithms (bayesian). Distance based algorithms (k- neighbors)		2 hours
8. Algorithms based on decision trees. Algorithms based on artificial neural networks and deep neural networks		6 hours
9. Rules based algorithms. Discovering association rules		2 hours
10. Parallel and distributed algorithms		2 hours
11. Web mining		2 hours
12. Spatial information mining. Temporal mining		2 hours

Bibliography

1. Győrödi Robert, Győrödi Cornelia, Recunoaşterea formelor şi Descoperirea cunoştinţelor, *Editura Mediamira*, Cluj, România, 2005, ISBN 973713088X.

2. Jamie MacLennan, ZhaoHui Tang, Bogdan Crivat, Data Mining with Microsoft SQL Server 2008, Wiley, 2008, ISBN 0470277742
3. Pang-Ning Tan, Michael Steinbach, Anuj Karpatne, Vipin Kumar, Introduction to Data Mining 2nd Edition, Pearson International Edition, 2018, ISBN 978-0133128901
4. Ripley, B. D., Pattern Recognition and Neural Networks, *Cambridge University Press*, 2008, ISBN 0521717701
5. Vancea, R., Holban, S., Ciubotariu, D., Recunoaşterea Formelor - Aplicaţii, *Editura Academiei R.S.R.*, Bucureşti 1989.
6. Duda, R. O., Hart, P. E., Stork, D.G., Pattern Classification (Pt.1) 2nd Edition, *Publisher: Wiley-Interscience*; 2nd edition November 9, 2000, ISBN-13: 978-0471056690
7. Neagoe, V., Stănăşilă O., Recunoaşterea Formelor şi Reţele Neuronale - Algoritmi fundamentali, Editura Matrix Rom, Bucureşti 1998.
8. Ian H.W., Eibe F., Mark A. Hall, et. al. Data Mining: Practical Machine Learning Tools and Techniques 4th Edition, *Morgan Kaufmann Publishers*, San Francisco, USA, 2016, ISBN 978-0128042915
9. Jiawei Han, Micheline Kamber, Data Mining Concepts and Techniques 3rd ed, *Morgan Kaufmann Publishers*, San Francisco, USA, 2011, ISBN 9780123814791
10. Margaret H. Dunham, Data Mining Introductory and Advanced Topics 1st Edition, Publisher : Pearson; 1st edition, February 11, 2002, ISBN 978-0130888921
11. Ethem Alpaydin, Introduction to Machine Learning, 4th ed (Adaptive Computation and Machine Learning series), The MIT Press; fourth edition (March 24, 2020), ISBN 0262043793
12. https://e.uoradea.ro/course/view.php?id=1945 Materials (courses and laboratories)

8.2 Academic laboratory	Teaching methods	No. of hours/ Observations
1. Introduction on the design of pattern recognition systems	Powerpoint presentation with the help of the video projector/Oral presentation. The students are assessed by a practical test using computer from laboratory topics.	2 hours
2. Decision and classification techniques		2 hours
3. Minimum distance classifier and Bayes classifier		2 hours
4. Classification algorithms. The n-mean algorithm		2 hours
5. Classification algorithms. The ISODATA algorithm		2 hours
6. Class separation criteria. Discriminant analysis		2 hours
7. Analysis of the main components		2 hours
8. Decision Trees based Algorithms. Algorithms based on artificial neural networks and deep neural networks		6 hours
9. Rule-Based Algorithms		2 hours
10. Algorithms for discovering the association rules. The Apriori, Sampling and Partitioning algorithms		2 hours
11. Parallel and distributed algorithms		2 hours
12. Final test		2 hours

Bibliography

1. Győrödi Robert, Győrödi Cornelia, Recunoaşterea formelor şi Descoperirea cunoştinţelor, *Editura Mediamira*, Cluj, România, 2005, ISBN 973713088X.
2. Győrödi Robert, Lungu Ion, Győrödi Cornelia, Sisteme avansate de descoperire a cunoștințelor din bazele de date, Editura Universității din Oradea, 2012, ISBN 9786061007332.
3. https://e.uoradea.ro/course/view.php?id=1945 Materials (courses and laboratories)

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

- The content of the discipline corresponds to the requirements necessary for the design and implementation of systems for pattern recognition and knowledge discovery.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard: 50% of the subjects from the final exam should be correctly solved - For 10: 100% of the subjects from the final exam should be correctly solved	Semester exam – written Two Assessments during the semester from the course and laboratory subjects	60%
10.5 Academic seminar	-	-	-
10.6 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard: 50% of the problems from the final laboratory test should be correctly solved - For 10: 100% of the problems from the final laboratory test should be correctly solved	Oral/written Evaluation of applications and interpretation of results	40%
10.7 Project			
10.8 Minimum performance standard: Course: 50% of the maximum score of the cumulate assessments Academic seminar: Laboratory: 50% of the maximum score of the laboratory evaluations Project:			

Course instructor

Head of department

Completion date:
26.09.2023

prof. dr. ing. Győrödi Robert
E-mail: rgyorodi@uoradea.ro

conf. dr. ing. Pater Mirela

Date of endorsement in the department:
27.09.2023

Date of endorsement in the Faculty Board:
29.09.2023

SUBJECT DESCRIPTION

1. Data related to the study program

1.1 Higher education institution	**UNIVERSITY OF ORADEA**
1.2 Faculty	**Faculty of Electrical Engineering and Information Technology**
1.3 Department	**1) Computers and information technology**
1.4 Field of study	**2) Computers and information technology**
1.5 Study cycle	**3) Bachelor**
1.6 Study program/Qualification	**4) / 5) Information Technology**

2. Data related to the subject

2.1 Name of the subject				**[6] Software engineering II**			
2.2 Holder of the subject				Associate Assistant dr. OVIDIU COMAN			
2.3 Holder of the academic seminar/laboratory/project				Associate Assistant dr. OVIDIU COMAN/Asoc.As.Ing. BERES SZILARD			
2.4 Year of study	IV	2.5 Semester	7	2.6 Type of the evaluation	[7] Ex	2.7 Subject regime	[8] SD

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	4	of which: 3.2 course	2	3.3 academic seminar/laboratory/project	0/1/1
3.4 Total of hours from the curriculum	56	Of which: 3.5 course	28	3.6 academic seminar/laboratory/project	0/14/14

Distribution of time	hours
Study using the manual, course support, bibliography and handwritten notes	20
Supplementary documentation using the library, on field-related electronic platforms and in field-related places	14
Preparing academic seminaries/laboratories/ themes/ reports/ portfolios and essays	44
Tutorials	2
Examinations	4
Other activities.	

3.7 Total of hours for individual study	**84**
3.9 Total of hours per semester	**140**
3.10 Number of credits	**5**

4. Pre-requisites (where applicable)

4.1 related to the curriculum	(Conditions)
4.2 related to skills	

5. Conditions (where applicable)

5.1. for the development of the course	Classroom equipped with video projector - Attendance at least 50% of the courses

5.2.for the development of the academic seminary/laboratory/project	Room equipped with computers and specific programs - Mandatory attendance at all laboratories; - A maximum of 3 works can be recovered during the semester (20%); The frequency of laboratory hours below 80% leads to the restoration of the discipline

6. Specific skills acquired	
Professional skills	C2. Software component design • Description of the structure and operation of software components • Explaining the role, interaction and operation of software system components C4. Improving the performance of software systems • Explaining the interaction of factors that determine software performance • Design and integration of information systems using technologies and programming environments C5. Design, life cycle management, integration and integrity of software systems • Specifying the relevant criteria regarding the life cycle, quality, safety and interaction of the computer system with the environment and with the human operator • The use of interdisciplinary knowledge for the adaptation of the computer system in relation to the requirements of the field of applications • Maintenance and operation of software systems.
Transversal skills	CT1. Honorable, responsible, ethical conduct in the spirit of the law to ensure the reputation of the profession

7. The objectives of the discipline (resulting from the grid of the specific competences acquired)

7.1 The general objective of the subject	▪ elaboration and study of the theories, methods and tools necessary for the elaboration of software products ▪ The aim is to acquire the theoretical notions of programming engineering: coding, program testing, delivery and documentation and maintenance of software projects.
7.2 Specific objectives	▪ Programming styles ▪ Coding metrics ▪ Testing software modules. General testing issues for object-oriented software ▪ Utilities for compressing, decompressing or storing software files. Installing. Documentation. ▪ Corrective maintenance. Adaptive software maintenance. Preventive software maintenance. ▪ Maintenance of an important software project

8. Contents*

8.1 Course	Teaching methods	No. of hours/ Observations
Chapter 1. Objectively oriented design.	Presentation, free discussions	2
Chapter 2. Real-time application design.	Presentation, free discussions	2
Chapter 3. Design of user interfaces.	Presentation, free discussions	2
Chapter 4. Software development.	Presentation, free discussions	2
Chapter 5. Software reuse.	Presentation, free discussions and report	2
Chapter 6. Component-based software engineering.	Presentation, free discussions	2
Chapter 7. Development of critical systems.	Presentation, free discussions and report	2
Chapter 8. Software evolution.	Presentation, free discussions	2
Chapter 9. Verification and validation.	Presentation, free discussions	2
Chapter 10. Testing software systems.	Presentation, free discussions	2

Chapter 11. Validation of systems	Presentation, free discussions	2
Chapter 12. Team management.	Presentation, free discussions.	2
Chapter 13. Estimating the cost of software.	Presentation, free discussions.	2
Chapter 14. Quality management.	Presentation, free discussions.	2
Bibliography 1. Software Engineering - Ian Sommerville, Editura Addison-Wesley, 2000 2. Software Engineering. Principles and practice - Hans van Vliet, Editura John Wiley & Sons, 2010 3. Software Engineering - modern approaches. - Eric J. Braude, Michael E. Bernstein, Editura John Wiley & Sons, 2008		
8.2 Academic seminar/laboratory/project	Teaching methods	No. of hours/ Observations
Laboratory		
1. Software systems planning	Introductory lecture; free and individual discussions; implementation of proposed programs.	2
2. Systems design.	Introductory lecture; free and individual discussions; implementation of proposed programs.	2
3. System implementation	Introductory lecture; free and individual discussions; implementation of proposed programs.	4
4. Implementation and integration of software systems	Introductory lecture; free and individual discussions; implementation of proposed programs.	4
5. Software maintenance	Introductory lecture; free and individual discussions; implementation of proposed programs.	2
8.4 Project		
1. Presentation of project themes.	Discussions. Individually work and also in small groups of students.	2
2. Establishing the requirements	Discussions. Individually work and also in small groups of students.	2
3. Design and modularization of the application	Discussions. Individually work and also in small groups of students.	2
4. Writing the code	Discussions. Individually work and also in small groups of students.	2
5. Testing and implementing the application	Discussions. Individually work and also in small groups of students.	2
6. Elaboration of design and use documentation.	Discussions. Individually work and also in small groups of students.	2
7. Teaching and supporting the project	Discussions. Individually work and also in small groups of students.	2
Bibliography 1. Ingineria programarii, indrumator de laborator - I. Mang, R. Gyorodi, Al. Toth, Univ. din Oradea, 2001		

2. Software Engineering. Principles and practice - Hans van Vliet, Editura John Wiley & Sons, 2010
3. Software Engineering - modern approaches. - Eric J. Braude, Michael E. Bernstein, Editura John Wiley & Sons, 2008

9. Corroboration of the discipline content with the expectations of the representatives of epistemological community, professional associations and representative employers in the field related to the program

Use of specific theories and tools to explain the operation and structure of software systems
Description of the structure and operation of software components Explaining the role, interaction and operation of software system components The content of the discipline is adapted to the requirements of specialized companies.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percent from the final mark
10.4 Course	Minimum required conditions for passing the exam (mark 5): in accordance with the minimum performance standard - For 10: the correct solving of all the subjects at the exam, the presence and activity at courses Activity at classes and essays	Final course evaluation and problem solving. Presentation of papers, attendance at courses	60%
10.5 Academic seminar	Minimum required conditions for passing the examination (grade 5): in accordance with the minimum performance standard - For 10:		
10.6 Laboratory	Minimum required conditions for promotion (grade 5): in accordance with the minimum performance standard Checking the theoretical preparation for the laboratory class and the way of accomplishing the proposed topics. In order to participate in the exam, it is necessary to perform all the laboratory works and to obtain a grade of 5 for the activity carried out during the semester. - For 10: the presence and activity at laboratory	Weekly evaluation of the laboratory preparation Tracking the activity along the way, practical applications.	20%

10.7 Project	In order to obtain grade 5, the student will have to teach the project in written form, treating the proposed topic theoretically.	At the end of the semester, the project is taught and supported in front of colleagues. It follows the evolution during the semester, the support of the project, the way of writing.	20%
10.8 Minimum performance standard: Course: Academic seminar: Laboratory: Project: - Carrying out projects respecting ethical and responsible behavior; - To be able to solve small and medium size problems in a POO manner in C ++ and Java. - To know the design methods that are used and the differences between them.			

Completion date: 15.09.2023

Date of endorsement in the department: 27.09.2023

Date of endorsement in the Faculty Board: 29.09.2023