SYLLABUS

1. Data about the program of study

1.1 Institution	The Technical University of Cluj-Napoca
1.2 Faculty	Faculty of Automation and Computer Science
1.3 Department	Computer Science
1.4 Field of study	**Computer Science and Information Technology**
1.5 Cycle of study	Bachelor of Science
1.6 Program of study/Qualification	Computer science/ Engineer
1.7 Form of education	Full time
1.8 Subject code	15.

2. Data about the subject

2.1 Subject name				***Electronic Measurements and Sensors***	
2.2 Course responsible/lecturer				Assoc. Professor Rodica Holonec, Phd eng	
2.3 Teachers in charge of seminars/ laboratory/ project				Lecturer Septimiu Crisan, Phd eng	
2.4 Year of study	II	2.5 Semester	1	2.6 Type of assessment (E - exam, C - colloquium, V - verification)	E
2.7 Subject category	*DF – fundamentală, DD – în domeniu, DS – de specialitate, DC – complementară*				DD
	DI – Impusă, DOp – opțională, DFac – facultativă				DI

3. Estimated total time

3.1 Number of hours per week	4	of which:	Course	2	Seminars		Laboratory	2	Project	
3.2 Number of hours per semester	56	of which:	Course	28	Seminars		Laboratory	28	Project	
3.3 Individual study:										
(a) Manual, lecture material and notes, bibliography										15
(b) Supplementary study in the library, online and in the field										8
(c) Preparation for seminars/laboratory works, homework, reports, portfolios, essays										15
(d) Tutoring										3
(e) Exams and tests										3
(f) Other activities:										-

3.4 Total hours of individual study (suma (3.3(a)…3.3(f)))	44
3.5 Total hours per semester (3.2+3.4)	100
3.6 Number of credit points	4

4. Pre-requisites (where appropriate)

4.1 Curriculum	
4.2 Competence	Basic Electrical circuit theory, Basic Electronics, Analysis methods for electronic circuits; General Physics

5. Requirements (where appropriate)

5.1. For the course	Amphitheatre equipped with blackboard, computer, projector and sound system
5.2. For the applications	Laboratory room equipped with specific measuring devices and sensors

6. Specific competence

6.1 Professional competences	**C1 –** Operating with basic Mathematical, Engineering and Computer Science concepts (2 credits) **C1.1 –** Recognizing and describing concepts that are specific to the fields of calculability, complexity, programming paradigms, and modeling computational and communication systems **C1.2 –** Using specific theories and tools (algorithms, schemes, models, protocols, etc.) for explaining the structure and the functioning of hardware, software and

	communication systems **C1.3 –** Building models for various components of computing systems **C1.4 –** Formal evaluation of the functional and non-functional characteristics of computing systems **C1.5 –** Providing a theoretical background for the characteristics of the designed systems **C2 –** Designing hardware, software and communication components (2 credits) **C2.1 –** Describing the structure and functioning of computational, communication and software components and systems **C2.2 –** Explaining the role, interaction and operation of hardware, software and communication components **C2.3 –** Construction of hardware and software components of computing systems using design methods, languages, algorithms, data structures, protocols and technologies **C2.4 –** Evaluating the functional and non-functional characteristics of the computing systems using specific metrics **C2.5 –** Implementation of hardware, software and communication components
6.2 Cross competences	N/A

7. Discipline objective (as results from the *key competences gained*)

7.1 General objective	To provide a foundation in important topics of engineering system instrumentation such as: metrology, measurement techniques, electronic measurement devices, sensors principles and applications , virtual instrumentation
7.2 Specific objectives	To provide principle knowledge, practical training and measurement best practice regarding the instrumentation systems To provide knowledge about sensors in order to perform the documentation, implementation, and development of complex equipment and measurement devices.

8. Contents

8.1 Lectures	Hours	Teaching methods	Notes
Measurement fundamentals. Terms and definitions. The structure of a complex instrumentation system. Sensors	2	Presentation, heuristic conversation, exemplification, problem presentation, teaching exercise, case study, formative evaluation	Projector, blackboard
Fundamentals of Metrology. Measurement Units. Measurements Standards. Traceability. Measurement terminology. Errors and Uncertainties. The Measuring Instrument Specifications.	2		
Random Errors Analysis. Basic Concepts in Probability. Normal Distribution. Central Limit Theorem. The Evaluation of Uncertainties in Measurements	2		
Meters. Analog Meters-Classifications and Symbols. Types of Analog Instruments. Voltmeters. Ammeters. Wattmeters, Ohmmeters	2		
Measurements with Bridges and Potentiometers. Wheatstone Bridge. Principle. Strain gauge measurement bridges. Types of AC bridges. Potentiometers.	2		
Amplification in Instrumentation. Operational Amplifiers. Basic circuits. Instrumentation Amplifiers. Current to Voltage, Resistance to Voltage Converters. Bridge Amplifiers.	2		
Electronic Voltmeters. DC Electronic Voltmeters. Types of AC Electronic Voltmeters. Lock-in Amplifiers. Principles and Applications	2		
Electronic Counters. Digital measurement of frequency and time	2		
Digital Multi-meters (DMM). Computing Measuring Systems. Data Acquisition Boards. Sample and Hold Circuits. Nyquist theorem.	2		
Data Acquisition Boards Components. Digital to Analog Converters.	2		

Analog to Digital Converters. Virtual Instruments			
The Analog and Digital Oscilloscopes	2		
Transducers, Sensors and Actuators. Terminology. Principles and Classifications. Analog and Digital Sensors.	2		
Analog Sensors. Potentiometers. Variable-Inductance and Capacitance Sensors. Temperature sensors.	2		
Digital sensors. Encoders. Optical Sensors: Fiber-Optic Sensors, Light sensors	2		

Bibliography

1. Rodica Holonec, Electrical Measurements and Instrumentation, Editura Mediamira, Cluj-Napoca, 2003, 259 p, ISBN 973-9357-42-3
2. Todoran, Gh.,Copandean,R; Masurari Electrice si Electronice.Editura Mediamira; Cluj Napoca. 2003. 282p. ISBN 973-9357-61-X.
3. Dragomir, N.D., TÂRNOVAN, I.G., Crişan, T.E. – Electrical Measurement of Non Electric Quantities. Vol. I. Editura MEDIAMIRA, Cluj-Napoca, România, 2002. ISBN 973-9358-75-6.
4. TÂRNOVAN, I. G. – Metrologie electrică şi instrumentaţie. Editura MEDIAMIRA, Cluj-Napoca, România, 2003. ISBN 973-9357-39-3.
5. Munteanu,R., TÂRNOVAN,I.G., Dragomir,N.D., Popovici,O. – Electrotehnică şi convertoare energetice. Editura MEDIAMIRA, Cluj-Napoca, România, 1997.
6. http://users.utcluj.ro/~tarnovan/Electronic%20Measurements%20and%20Sensors.htm

8.2 Applications – Seminars/Laboratory/Project	Hours	Teaching methods	Notes
Analog and Digital Measurement Devices	2	Exposure applications	Experimental circuits, Computer LabView software, NI hardware
Domain Extension of Analog Measurement Instruments	2		
Single-phased A.C. Circuits Measurements	2		
The Wheatstone Bridge	2		
The Oscilloscope. Basics and Measuring Principles	2		
Virtual Instrumentation: LabView - Basic Operations	2		
Virtual Instrumentation applications	2		
Data Acquisition Systems: Single Sample Acquisition Mode	2		
Data Acquisition Systems. Signal Processing Applications	2		
Temperature Measurement	2		
Level and Flow Measurement	2		
Displacement Measurement	2		
Angular Speed Measurement	2		
Final Assessment of Laboratory Reports	2		

Bibliography

1. Rodica Holonec, B. Tebrean, I.G. Tarnovan, Gh. Todoran, Electronic Measurements: Laboratory Manual Editura U.T. PRESS, Cluj-Napoca 2010, ISBN.978-973-662-600
2. Munteanu,R., Dragomir,N.D., TÂRNOVAN,I.G., Holonec,Rodica, Bortoş,P. – Tehnici de măsurare. Îndrumător de laborator. Atelierul de multiplicare al U.T.C.-N., 1995.

[*]Se vor preciza, după caz: tematica seminariilor, lucrările de laborator, tematica și etapele proiectului.

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The acquired skills will be required of employees who work in designing or testing of sensors and instrumentation systems.

10. Evaluation

Activity type	Assessment criteria	Assessment methods	Weight in the final grade
Course	Final exam (E)-Theoretical questions and exercises (3 hours)	Written examination	80%

Seminar			
Laboratory	Practical circuit (P) Homework (HW)	Checking of functionality Verification of results	10% 10%
Project			
Minimum standard of performance: G=(E+P+HW)/100; Condition to take the credits: G≥5;			

Course responsible
Assoc.Prof. Rodica Holonec, PhD eng

Head of department
Prof. Rodica Potolea, PhD eng

SYLLABUS

1. Data about the program of study

1.1 Institution	The Technical University of Cluj-Napoca
1.2 Faculty	Faculty of Automation and Computer Science
1.3 Department	Computer Science
1.4 Field of study	**Computer Science and Information Technology**
1.5 Cycle of study	Bachelor of Science
1.6 Program of study/Qualification	Computer science/ Engineer
1.7 Form of education	Full time
1.8 Subject code	16.

2. Data about the subject

2.1 Subject name				***Fundamental Algorithms***	
2.2 Course responsible/lecturer				Prof. dr. eng. Rodica Potolea – Rodica.Potolea@cs.utcluj.ro	
2.3 Teachers in charge of seminars/ laboratory/ project				Assoc.prof.dr.eng. Camelia Lemnaru – Camelia.Lemnaru@cs.utcluj.ro	
2.4 Year of study	II	2.5 Semester	1	2.6 Type of assessment (E - exam, C - colloquium, V - verification)	E
2.7 Subject category	*DF – fundamentală, DD – în domeniu, DS – de specialitate, DC – complementară*				DD
	DI – Impusă, DOp – opțională, DFac – facultativă				DI

3. Estimated total time

3.1 Number of hours per week	5	of which:	Course	2	Seminars	1	Laboratory	2	Project	
3.2 Number of hours per semester	70	of which:	Course	28	Seminars	14	Laboratory	28	Project	
3.3 Individual study:										
(a) Manual, lecture material and notes, bibliography										21
(b) Supplementary study in the library, online and in the field										26
(c) Preparation for seminars/laboratory works, homework, reports, portfolios, essays										16
(d) Tutoring										8
(e) Exams and tests										9
(f) Other activities:										

3.4 Total hours of individual study (suma (3.3(a)…3.3(f)))	80
3.5 Total hours per semester (3.2+3.4)	150
3.6 Number of credit points	6

4. Pre-requisites (where appropriate)

4.1 Curriculum	Imperative programming languages (C şi / sau Java) Data Structures and Algorithms
4.3 Competence	Acquire the abilities of designing, implementing, testing and evaluating programs to solve specific problems

5. Requirements (where appropriate)

5.1. For the course	Whiteboard, projector, computer
5.2. For the applications	Computers/Network of computers, C ++

6. Specific competence

6.1 Professional competences	**C3.** Problems solving using specific Computer Science and Computer Engineering tools (5 credit points) **C3.1-** Identifying classes of problems and solving methods that are specific to computing systems **C3.2 -** Using interdisciplinary knowledge, solution patterns and tools, making experiments and interpreting their results

	C3.3 - Applying solution patterns using specific engineering tools and mehods **C3.4 -** Evaluating, comparatively and experimentally, the available alternative solutions for performance optimization **C3.5 -** Developing and implementing informatic solutions for concrete problems **C4.** Improving performances of hardware, software and communication systems **C4.1 -** Identifying and describing the defining performance elements of hardware, software and communication systems **C4.2 -** Explaining the interaction of the factors that determine the performances of hardware, software and communication systems **C4.3 -** Applying fundamental methods and principles for increasing performance of hardware, software and communication systems **C4.4 -** Choosing criteria and methods for performance evaluation of hardware, software and communication systems **C4.5 -** Developing performance based professional solutions for hardware, software and communication systems
6.2 Cross competences	N/A

7. Discipline objective (as results from the *key competences gained*)

7.1 General objective	• Acquiring modern study of algorithms: design and analysis
7.2 Specific objectives	• Learn to identify and design efficient solutions to problems • Learn methods to evaluate efficiency • Learn the basic polynomial algorithms • Learn basic computational complexity • Algorithms description with focus on control structures • Learning the correct implementation following the pseudocode • Efficient implementation of key polynomial algorithms • Estimation of algorithms' efficiency: space and processing time

8. Contents

8.1 Lectures	Hours	Teaching methods	Notes
Mathematical Foundations: Asymptotical notation, Recurrence	2	Whiteboard, projector, computer; Lectures, discussions, Q&A sessions	
Complexity Classes	2		
Sorting and Order Statistics	2		
Sorting and Order Statistics (continued)	2		
Advanced Data Structures : Hash Tables, Trees	2		
Advanced Data Structures: Heaps, Disjoint Sets	2		
Design and Analysis Advanced Techniques: Dynamic Programming	2		
Design and Analysis Advanced Techniques: Greedy Algorithms	2		
Design and Analysis Advanced Techniques: Damping Analyze	2		
Graphs: Search in a Graph, Minimal Spanning Tree	2		
Graphs: Shortest path	2		
Graphs: Max Flow	2		
Graphs: Bipartite Graphs	2		
Learn the basic Complexity sets and representative problems	2		
Bibliography 1. T. Cormen, C. Rleiserson, R. Rivest, C. Stein, *Introduction to Algorithms, Second Edition*, The MIT Press, 2001			
8.2 Applications – Seminars/Laboratory/Project	Hours	Teaching methods	Notes
Efficient implementation and comparison of sorting algorithms		Hands on work on specific algorithms; weekly assessment, feedback, and assistance	
Efficient implementation and comparison of sorting algorithms (continued)			
Efficient implementation and comparison of lists algorithms			
Efficient implementation and comparison of lists algorithms (continued)			
Efficient implementation and comparison of trees algorithms			
Efficient implementation and comparison of trees algorithms			

(continued)			
Implementation of augmented data structures			
Implementation of augmented data structures (continued)			
Efficient implementation of graphs algorithms			
Efficient implementation of graphs algorithms (continued)			
Efficient implementation of graphs algorithms (continued)			
Efficient implementation of graphs algorithms (continued)			
Approximation algorithms			
Final Evaluation			

Bibliography

1. T. Cormen, C. Rleiserson, R. Rivest, C. Stein, *Introduction to Algorithms, Second Edition*, The MIT Press, 2001

[*] *Se vor preciza, după caz: tematica seminariilor, lucrările de laborator, tematica și etapele proiectului.*

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The topic is fundamental in the field of Computer and Information Technology, its content is beyond dispute, familiarizing students with the principles of algorithms design and analysis. The content is similar (including the textbook) with all representative computer science departments in the world, is a core course in the ACM curricula and was rated by the Romanian governmental agencies (CNEAA and ARACIS).

10. Evaluation

Activity type	Assessment criteria	Assessment methods	Weight in the final grade
Course	Theoretical analysis and problem solving skills	Written exam	70% (20% MT + 50% FE)
Seminar	Hands on Problem solving skills	Implementation/ hands on	30% (Lab)
Laboratory			
Project			

Minimum standard of performance:
Grade calculus: 20% midterm + 30% laboratory + 50% final exam
Conditions for participating in the final exam: Laboratory ≥ 5
Conditions for promotion: final exam ≥ 5

Course responsible
Prof.dr.eng. Rodica Potolea

Head of department
Prof.dr.eng. Rodica Potolea

SYLLABUS

1. Data about the program of study

1.1 Institution	The Technical University of Cluj-Napoca
1.2 Faculty	Faculty of Automation and Computer Science
1.3 Department	Computer Science
1.4 Field of study	**Computer Science and Information Technology**
1.5 Cycle of study	Bachelor of Science
1.6 Program of study/Qualification	Computer science/ Engineer
1.7 Form of education	Full time
1.8 Subject code	17.

2. Data about the subject

2.1 Subject name				***Analog and digital circuits***	
2.2 Course responsible/lecturer				Prof. dr. eng. Dădârlat Vasile Teodor – Vasile.Dadarlat@cs.utcluj.ro	
2.3 Teachers in charge of seminars/ laboratory/ project				Conf. dr. eng. Peculea Adrian – Adrian.Peculea@cs.utcluj.ro Sl. dr. eng. Iancu Bogdan – Bogdan.Iancu@cs.utcluj.ro	
2.4 Year of study	II	2.5 Semester	1	2.6 Type of assessment (E - exam, C - colloquium, V - verification)	E
2.7 Subject category	*DF – fundamentală, DD – în domeniu, DS – de specialitate, DC – complementară*				DD
	DI – Impusă, DOp – opțională, DFac – facultativă				DI

3. Estimated total time

3.1 Number of hours per week	4	of which:	Course	2	Seminars		Laboratory	2	Project	
3.2 Number of hours per semester	56	of which:	Course	28	Seminars		Laboratory	28	Project	
3.3 Individual study:										
(a) Manual, lecture material and notes, bibliography										10
(b) Supplementary study in the library, online and in the field										12
(c) Preparation for seminars/laboratory works, homework, reports, portfolios, essays										14
(d) Tutoring										2
(e) Exams and tests										6
(f) Other activities:										0

3.4 Total hours of individual study (suma (3.3(a)…3.3(f)))	44
3.5 Total hours per semester (3.2+3.4)	100
3.6 Number of credit points	4

4. Pre-requisites (where appropriate)

4.1 Curriculum	
4.4 Competence	Basic knowledge in Physics, Electronics, Mathematics

5. Requirements (where appropriate)

5.1. For the course	Multimedia means
5.2. For the applications	Classroom, PC with internet access

6. Specific competence

6.1 Professional competences	**C2:** Designing hardware, software and communication components **C2.1:** Describing the structure and functioning of computational, communication and software components and systems **C2.2:** Explaining the role, interaction and functioning of hardware, software and communication components **C2.3:** Building the hardware and software components of some computing systems using algorithms, design methods, protocols, languages, data structures, and technologies

	C2.4: Evaluating the functional and non-functional characteristics of the computing systems using specific metrics **C2.5:** Implementing hardware, software and communication systems
6.2 Cross competences	N/A

7. Discipline objective (as results from the *key competences gained*)

7.1 General objective	Teamwork, understanding of basic digital electronics principles
7.2 Specific objectives	Each student able to understand the functionality for the main circuits from a motherboard

8. Contents

8.1 Lectures	Hours	Teaching methods	Notes
Introduction. Electrical signals, passive devices, linear circuits behavior at elementary signals application.	2	Oral Presentations using multimedia means Q & A Interactive teaching	
Semiconductor devices (I). Semiconductor, Schottky, Zener and light emitting diode.	2		
Semiconductor devices (II). Bipolar and field effect transistor.	2		
Operational amplifiers. Characteristics, circuits with operational amplifiers with negative feedback.	2		
DC power supplies. Rectifiers, filters. Parametric, feedback and integrated voltage regulators. Oscillators. Positive feedback, oscillator circuits.	2		
Integrated logic circuit parameters. Static transfer characteristics, noise margins, fan-in and fan-out, propagation time, power dissipation.	2		
Integrated logic circuit families (I). TTL integrated logic circuits.	2		
Integrated logic circuit families (II). NMOS, CMOS and HCT integrated logic circuits.	2		
Bus building with logic circuits. Open collector and three state integrated logic circuits, connecting circuits to buses, transfer between registers and three state logic.	2		
Positive feedback circuits (I). Schmitt trigger and flip-flop circuits.	2		
Positive feedback circuits (II). Monostable and astable circuits.	2		
Semiconductor memories. Volatile and non-volatile semiconductor memories.	2		
Converters. Sampling, signal quantization, analog to digital and digital to analog converters.	2		
Microcontrollers. Architecture, memory addressing, interrupt and timer system, serial communication.	2		
Bibliography 1. Vasile Teodor Dadarlat, Adrian Peculea, „Circuite analogice si numerice”, Ed. U.T.PRES, Cluj-Napoca, 2006, ISBN (10) 973-662-243-6 ISBN (13) 978-973-662-243-4.			

8.2 Applications – Seminars/Laboratory/Project	Hours	Teaching methods	Notes
Electrical signals and liner circuits.	2	Practical exercises Brief presentation of possible solutions Self testing programmes	
Semiconductor, Schottky, Zener and light emitting diode.	2		
Bipolar and field effect transistor.	2		
Circuits with passive and semiconductor devices.	2		
Circuits with operational amplifiers with negative feedback.	2		
Rectifiers, filters and regulators.	2		
Oscillator circuits.	2		
Bipolar integrated logic circuits.	2		
MOS integrated logic circuits.	2		
Open collector integrated logic circuits.	2		
Three state integrated logic circuits.	2		

Schmitt trigger circuits.	2		
Multivibrator circuits.	2		
Laboratory test	2		

Bibliography

1. Slides for Analog an digital circuits courses + sets of problems and applications for individual study at ftp://ftp.utcluj.ro/pub/users/dadarlat/circ_analognumeric-calc

Se vor preciza, după caz: tematica seminariilor, lucrările de laborator, tematica și etapele proiectului.

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

Course content is kept state of the art by using latest technologies and devices available on the market

10. Evaluation

Activity type	Assessment criteria	Assessment methods	Weight in the final grade
Course	Interactivity and initial preparation, intermediary and final written examinations	Written exam (2,5 h).	70%
Seminar			
Laboratory	Quality of practical work, participation	Continuous assessment, final written colloquium	30%
Project			

Minimum standard of performance:
Grade calculus: 30% laboratory + 70% final exam
Conditions for participating in the final exam: Laboratory ≥ 5
Conditions for promotion: grade ≥ 5

Course responsible
Prof. dr. eng. Vasile Dădârlat

Head of department
Prof.dr.eng. Rodica Potolea

SYLLABUS

1. Data about the program of study

1.1 Institution	The Technical University of Cluj-Napoca
1.2 Faculty	Faculty of Automation and Computer Science
1.3 Department	Computer Science
1.4 Field of study	**Computer Science and Information Technology**
1.5 Cycle of study	Bachelor of Science
1.6 Program of study/Qualification	Computer science/ Engineer
1.7 Form of education	Full time
1.8 Subject code	18.

2. Data about the subject

2.1 Subject name				***Object Oriented Programming***	
2.2 Course responsible/lecturer				S.l. dr. eng. Marius Joldoş – Marius.Joldos@cs.utcluj.ro	
2.3 Teachers in charge of seminars/ laboratory/ project				Eng. Giuroiu Titus-Nicolae, MS – titus.giuroiu@gmail.com Eng. Bondor Alexandru Viorel – alexandru.viorel.bondor@gmail.com	
2.4 Year of study	II	2.5 Semester	1	2.6 Type of assessment (E - exam, C - colloquium, V - verification)	E
2.7 Subject category	*DF – fundamentală, DD – în domeniu, DS – de specialitate, DC – complementară*				DD
	DI – Impusă, DOp – opțională, DFac – facultativă				DI

3. Estimated total time

3.1 Number of hours per week	4	of which:	Course	2	Seminars		Laboratory	2	Project	
3.2 Number of hours per semester	56	of which:	Course	28	Seminars		Laboratory	28	Project	
3.3 Individual study:										
(a) Manual, lecture material and notes, bibliography										25
(b) Supplementary study in the library, online and in the field										17
(c) Preparation for seminars/laboratory works, homework, reports, portfolios, essays										16
(d) Tutoring										6
(e) Exams and tests										5
(f) Other activities:										0

3.4 Total hours of individual study (suma (3.3(a)…3.3(f)))	69
3.5 Total hours per semester (3.2+3.4)	125
3.6 Number of credit points	5

4. Pre-requisites (where appropriate)

4.1 Curriculum	Computer Programming course
4.5 Competence	Use of a procedural programming language such as C

5. Requirements (where appropriate)

5.1. For the course	
5.2. For the applications	

6. Specific competence

6.1 Professional competences	**C2 –** Designing hardware, software and communication components (5 credits) **C2.1 –** Describing the structure and functioning of computational, communication and software components and systems **C2.2 –** Explaining the role, interaction and functioning of hardware, software and communication components **C2.3 –** Building the hardware and software components of some computing systems using algorithms, design methods, protocols, languages, data structures, and technologies

	C2.4 - Metric based evaluation of functional and non-functional characteristics of computing systems **C2.5 -** Implementation of hardware, software and communication components
6.2 Cross competences	N/A

7. Discipline objective (as results from the *key competences gained*)

7.1 General objective	To learn a rigorous treatment of object-oriented concepts using Java as an example language
7.2 Specific objectives	• to prepare object-oriented design for small/medium scale problems • to demonstrate the differences between traditional imperative design and object-oriented design • to explain class structures as fundamental, modular building blocks • to understand the role of inheritance, polymorphism, dynamic binding and generic structures in building reusable code • to write small/medium scale Java programs with simple graphical user interface • to use classes written by other programmers when constructing their systems • to be able to design and build simple Graphical User Interfaces (GUI)s.

8. Contents

8.1 Lectures	Hours	Teaching methods	Notes
Concepts and paradigms in OOP. On to Java	2	Lectures, demos and discussions	Uses a video-projector
Control structures in Java.	2		
Classes and Objects. Arrays	2		
Packages. Inheritance and polymorphism.	2		
Java Interfaces. OO Application Development	2		
UML Object and Class Diagrams. Assertions.	2		
Testing. Debugging. Java Errors and Exceptions	2		
Java Collections. Generic Programming.	2		
Introduction to Java I/O	2		
Event handling in Java. Introduction to Java Graphics	2		
Graphical User Interfaces (I)	2		
Introduction to Threads	2		
Graphical User Interfaces (II)	2		
Review	2		

Bibliography

1. Bruce Eckel, Thinking in Java, Third Edition, Prentice Hall PTR, 2002 (downloadable for free from the Web).
2. Paul & Harvey Deitel, Java. How to Program (Early Objects), Tenth Edition, Prentice Hall, 2015
3. David J. Barnes & Michael Kölling, Objects First with Java. A Practical Introduction using BlueJ, Fifth Edition, Prentice Hall / Pearson Education, 2012
4. Oracle Java Tutorials (freely downloadable from the Web)
5. Schmuller Joseph, SAMS teach yourself UML in 24 hours, 2004

8.2 Applications – Seminars/Laboratory/Project	Hours	Teaching methods	Notes
Using BlueJ IDE	2	Tutoring, discussions, and assisted program development	PCs equipped with Java SDK and IDEs (BlueJ, Eclipse, Netbeans)
Primitive Types and Simple IO in Java	2		
Variables and Expressions in Java	2		
Flow Control and Simple Classes in Java	2		
Classes, Objects and Arrays	2		
Java Inheritance	2		
Java Interfaces	2		
Laboratory test 1	2		
Java Exception Handling.	2		
Collections	2		
Testing OOP programs	2		

GUIs. Event Handling	2		
GUIs. Keyboard and Mouse Handling	2		
Laboratory test 2	2		
Bibliography 1. Course Moodle site available at: https://labacal.utcluj.ro			

**Se vor preciza, după caz: tematica seminariilor, lucrările de laborator, tematica și etapele proiectului.*

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The contents of the course is in accordance with the ACM Computer Science Curricula recommendations Java programming language is the most widely used language.

10. Evaluation

Activity type	Assessment criteria	Assessment methods	Weight in the final grade
Course	Ability to solve problems using the object orientated paradigm	Written exams: In-class tests Final	 10% 50%
Seminar			
Laboratory	Quality of laboratory applications and evaluation of the laboratory tests	Specifications and code analysis and evaluation	40%
Project			
Minimum standard of performance: Grade calculus: 10% midterm + 40% laboratory + 50% final exam Conditions for participating in the final exam: Laboratory ≥ 5 Conditions for promotion: grade ≥ 5			

Course responsible
S.l. dr. eng. Marius Joldoş

Head of department
Prof.dr.eng. Rodica Potolea

SYLLABUS

1. Data about the program of study

1.1 Institution	The Technical University of Cluj-Napoca
1.2 Faculty	Faculty of Automation and Computer Science
1.3 Department	Computer Science
1.4 Field of study	**Computer Science and Information Technology**
1.5 Cycle of study	Bachelor of Science
1.6 Program of study/Qualification	Computer science/ Engineer
1.7 Form of education	Full time
1.8 Subject code	19.

2. Data about the subject

2.1 Subject name				***DataBase***	
2.2 Course responsible/lecturer				S.l. dr. eng. Călin Cenan – Calin.Cenan@cs.utcluj.ro	
2.3 Teachers in charge of seminars/ laboratory/ project				Conf. dr. eng. Delia Mitrea – Delia.Mitrea@cs.utcluj.ro	
2.4 Year of study	II	2.5 Semester	1	2.6 Type of assessment (E - exam, C - colloquium, V - verification)	E
2.7 Subject category	*DF – fundamentală, DD – în domeniu, DS – de specialitate, DC – complementară*				DD
	DI – Impusă, DOp – opțională, DFac – facultativă				DI

3. Estimated total time

3.1 Number of hours per week	4	of which:	Course	2	Seminars		Laboratory	2	Project	
3.2 Number of hours per semester	56	of which:	Course	28	Seminars		Laboratory	28	Project	
3.3 Individual study:										
(a) Manual, lecture material and notes, bibliography										11
(b) Supplementary study in the library, online and in the field										18
(c) Preparation for seminars/laboratory works, homework, reports, portfolios, essays										11
(d) Tutoring										1
(e) Exams and tests										3
(f) Other activities:										

3.4 Total hours of individual study (suma (3.3(a)…3.3(f)))	44
3.5 Total hours per semester (3.2+3.4)	100
3.6 Number of credit points	4

4. Pre-requisites (where appropriate)

4.1 Curriculum	Mathematics
4.6 Competence	Set theory

5. Requirements (where appropriate)

5.1. For the course	Board, video projector, computer; student present in mandatory 50% of days for admission to the final exam
5.2. For the applications	Computers, specific software; student present in mandatory 100% of days for admission to the final exam

6. Specific competence

6.1 Professional competences	**C4** - Improving the performances of the hardware, software and communication systems **C4.1** - Identifying and describing the defining elements of the performances of the hardware, software and communication systems **C4.2** - Explaining the interaction of the factors that determine the performances of the hardware, software and communication systems

	C4.3 - Applying the fundamental methods and principles for increasing the performances of the hardware, software and communication systems **C4.4** - Choosing the criteria and evaluation methods of the performances of the hardware, software and communication systems **C4.5** - Developing professional solutions for hardware, software and communication systems based on performance optimization
6.2 Cross competences	N/A

7. Discipline objective (as results from the *key competences gained*)

7.1 General objective	Developing general skills in databases and database applications
7.2 Specific objectives	Assimilate theoretical knowledge on relational databases, Structured Query Language SQL language Presentation of Database Management Systems DBMS Getting practical skills for designing and implementing database and development of database application

8. Contents

8.1 Lectures	Hours	Teaching methods	Notes
Introduction. Database, Database Management Systems	2	PDF & PPT Presentations; Demonstrations and model presentations on board; small exercises to increase interaction	
Database Management Systems Architecture	2		
Entity – Relation Model	2		
Relational Model	2		
Database Design; Optimization, Normal forms	2		
Entities; Relations; Constraints; Views (II)	2		
Physical database design	2		
Indexes	2		
Relational Algebra	2		
Relational Calculus	2		
Query by example	2		
Structured Query Language – SQL	2		
Database administration; Security	2		
Database Applications	2		

Bibliography

1. Alexandru Leluţiu - *Perenitatea Concepteleor Promovate de BAZELE de DATE*, Ed. Albastra, 2003
2. Raghu Ramakrishnan and Johannes Gehrke - *Database Management Systems*, McGraw-Hill Science, 2002
3. Hector Garcia-Molina, Jeff Ullman, and Jennifer Widom - *First Course in Database Systems*, Prentice Hall, 2001
4. P. O'Neil, E. O'Neil - *DATABSE Principles, Programming and Performance*, Academic Press Morgan Kaufmann, 1994
5. Philip Greenspun - *SQL for Web Nerds*, http://philip.greenspun.com/sql/
6. Ryan K. Stephens, Ronald R. Plew, - *Teach Yourself SQL in 21 Days*, Prentice Hall, 1999

8.2 Applications – Seminars/Laboratory/Project	Hours	Teaching methods	Notes
Microsoft SQL Server presentation	2	Exposure and applications	Computers, MS SQL Server, MySQL, Apache Web Server, PHP
MS SQL Server administration	2		
MS SQL Server databases: Tables; Relationships; Database diagrams	2		
MS SQL Server databases: Indexes; Constraints; Views	2		
MS SQL Server databases: INSERT, UPDATE, DELETE	2		
Structured Query Language – SQL – Simple SELECT	2		
Structured Query Language – SQL – Advanced SELECT	2		
MySQL presentation; MySQL administration	2		
MySQL databases	2		
Examples of Web Database Applications	2		
Database design – simple examples	2		
Database design – more complex examples	2		
Project Work – Web Database Applications	2		
Final laboratory work evaluation	2		

Bibliography

1. Raghu Ramakrishnan and Johannes Gehrke - *Database Management Systems*, McGraw-Hill Science, 2002
2. Hector Garcia-Molina, Jeff Ullman, and Jennifer Widom - *First Course in Database Systems*, Prentice Hall, 2001
3. Philip Greenspun - *SQL for Web Nerds*, http://philip.greenspun.com/sql/
4. Ryan K. Stephens, Ronald R. Plew, - *Teach Yourself SQL in 21 Days*, Prentice Hall, 1999

**Se vor preciza, după caz: tematica seminariilor, lucrările de laborator, tematica și etapele proiectului.*

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

Database is a topic of Computer Engineering and Information Technology field, combining fundamental aspects and practical software tools. Explaining to students the principles of database implementation, database design and implementing database application . Course content it is similar to database courses in other universities in the country and abroad.

10. Evaluation

Activity type	Assessment criteria	Assessment methods	Weight in the final grade
Course	Solving problems and answers to theoretical questions	2.5 hours written evaluation	60% (a grade greater than 5 is mandatory)
Seminar			
Laboratory	Presenting databases implemented in 2 different DBMS; Knowing Structured Query Language Project Work: Web Database Applications	Ongoing evaluation Final presentation	30% (a grade greater than 5 is mandatory) 10%
Project			
Minimum standard of performance: Solving practical laboratory work, implementing a database and a database application, solving the SQL Structured Query Language problem and another two out of the four other subjects. Grade calculus: 40% lab + 60% final exam Conditions for participating in the final exam: Lab ≥ 5 Conditions for promotion: final exam ≥ 5			

Course responsible
S.l.dr.ing. Calin Cenan

Head of department
Prof.dr.eng. Rodica Potolea

SYLLABUS

1. Data about the program of study

1.1 Institution	The Technical University of Cluj-Napoca
1.2 Faculty	Faculty of Automation and Computer Science
1.3 Department	Computer Science
1.4 Field of study	**Computer Science and Information Technology**
1.5 Cycle of study	Bachelor of Science
1.6 Program of study/Qualification	Computer science/ Engineer
1.7 Form of education	Full time
1.8 Subject code	20.

2. Data about the subject

2.1 Subject name				***Special Mathematics in Engineering***	
2.2 Course responsible/lecturer				Prof.dr. Ioan Rasa Ioan.Rasa@math.utcluj.ro	
2.3 Teachers in charge of seminars/ laboratory/ project				Assoc.prof.dr. Daniela Inoan - Daniela.Inoan@math.utcluj.ro	
2.4 Year of study	II	2.5 Semester	1	2.6 Type of assessment (E - exam, C - colloquium, V - verification)	E
2.7 Subject category	*DF – fundamentală, DD – în domeniu, DS – de specialitate, DC – complementară*				DF
	DI – Impusă, DOp – opțională, DFac – facultativă				DI

3. Estimated total time

3.1 Number of hours per week	4	of which:	Course	2	Seminars	2	Laboratory		Project	
3.2 Number of hours per semester	56	of which:	Course	28	Seminars	28	Laboratory		Project	
3.3 Individual study:										
(a) Manual, lecture material and notes, bibliography										20
(b) Supplementary study in the library, online and in the field										20
(c) Preparation for seminars/laboratory works, homework, reports, portfolios, essays										26
(d) Tutoring										
(e) Exams and tests										3
(f) Other activities:										

3.4 Total hours of individual study (suma (3.3(a)…3.3(f)))	69
3.5 Total hours per semester (3.2+3.4)	125
3.6 Number of credit points	5

4. Pre-requisites (where appropriate)

4.1 Curriculum	Elementary knowledge of complex numbers. Elements of calculus.
4.7 Competence	Competences in using complex numbers (in algebraic and trigonometric form). Ability to calculate derivatives and real integrals.

5. Requirements (where appropriate)

5.1. For the course	Blackboard, videoprojector
5.2. For the applications	Blackboard, videoprojector

6. Specific competence

6.1 Professional competences	**C1 –** Operating with basic Mathematical, Engineering and Computer Science concepts **C1.1 -** Recognizing and describing specific concepts to calculability, complexity, programming paradigms and modeling of computing and communication systems **C1.2 -** Using specific theories and tools (algorithms, schemes, models, protocols, etc.) for explaining the structure and the functioning of hardware, software and

	communication systems **C1.3 -** Building models for various components of computing systems **C1.4 -** Formal evaluation of the functional and non-functional characteristics of computing systems **C1.5 -** Providing theoretical background for the characteristics of the designed systems
6.2 Cross competences	N/A

7. Discipline objective (as results from the *key competences gained*)

7.1 General objective	A presentation of the concepts, notions, methods and fundamental techniques used in complex functions theory and integral transforms theory.
7.2 Specific objectives	Use of the complex functions theory and integral transforms theory for solving problems in engineering.

8. Contents

8.1 Lectures	Hours	Teaching methods	Notes
Complex numbers. Operations, topology in C.	2	Explanation Demonstration Collaboration Interactive activities	
Continuity. Monogenic functions. The Cauchy-Riemann conditions. Holomorphic functions.	2		
The complex integral. Definition. Cauchy's integral theorem. Cauchy's integral formula.	2		
Taylor and Laurent series. Singular points, classification.	2		
Residues. The Residue Theorem.	2		
Applications of the Residue Theorem.	2		
Real integrals calculated with complex methods.	2		
The Fourier transform. Definition, properties.	2		
Applications of the Fourier transform.	2		
The Laplace transform. Definition and properties.	2		
The inverse Laplace transform.	2		
Applications of the Laplace transform.	2		
The z transform. Applications.	2		
Difference equations. The z transform applied to solving difference equations.	2		
Bibliography 1. A.I. Mitrea, Analiza matematica in complex (curs+culegere de probleme), Ed. Mediamira, Cluj-Napoca, 2005. 2. A.I. Mitrea, Transformari integrale si discrete (curs + culegere de probleme) Ed. Mediamira, Cluj-Napoca, 2004. 3. M.L. Krasnov, A.I. Kiselev, G.I. Makarenko, Functions of a Complex Variable, Operational Calculus and Stability Theory, Mir Publishers, Moscow, 1984.			

8.2 Applications – Seminars/Laboratory/Project	Hours	Teaching methods	Notes
Operations in C. Geometric interpretations.	2	Explanation Demonstration Collaboration Interactive activities	
The Cauchy-Riemann conditions. Holomorphic functions.	2		
Elementary functions, equations in the complex domain.	2		
The complex integral.	2		
Series of functions.	2		
Residues. The Residue Theorem.	2		
Computing real integrals by using the Residue Theorem.	2		
The Fourier transform.	2		
Properties and apploications of the Fourier transform	2		
The Laplace transform.	2		
The inverse Laplace transform.	2		
Applications of the Laplace transform.	2		
The z transform.	2		
Difference equations solved with the z transform.	2		
Bibliography			

1. A.I. Mitrea, Analiza matematica in complex (curs+culegere de probleme), Ed. Mediamira, Cluj-Napoca, 2005.
2. A.I. Mitrea, Transformari integrale si discrete (curs + culegere de probleme) Ed. Mediamira, Cluj-Napoca, 2004.
3. M.L. Krasnov, A.I. Kiselev, G.I. Makarenko, Functions of a Complex Variable, Operational Calculus and Stability Theory, Mir Publishers, Moscow, 1984.

*Se vor preciza, după caz: tematica seminariilor, lucrările de laborator, tematica și etapele proiectului.

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

Collaboration with engineers in order to identify and solve problems raised by the market.

10. Evaluation

Activity type	Assessment criteria	Assessment methods	Weight in the final grade
Course	Abilities of understanding and using creatively the concepts and proofs	Written examination	30%
Seminar	Abilities of solving problems and applying algorithms	Written examination	70%
Laboratory			
Project			
Minimum standard of performance: Ability to present coherently a theoretical subject and to solve problems with practical content.			

Course responsible
Prof.dr.Ioan Rasa

Head of department
Prof.dr.eng. Rodica Potolea

SYLLABUS

1. Data about the program of study

1.1 Institution	The Technical University of Cluj-Napoca
1.2 Faculty	Faculty of Automation and Computer Science
1.3 Department	Computer Science
1.4 Field of study	**Computer Science and Information Technology**
1.5 Cycle of study	Bachelor of Science
1.6 Program of study/Qualification	Computer science/ Engineer
1.7 Form of education	Full time
1.8 Subject code	21.

2. Data about the subject

2.1 Subject name				***Foreign Language I (English, French, German - Technical documents elaboration)***	
2.2 Course responsible/lecturer				Lector dr. Monica Negoescu	
2.3 Teachers in charge of seminars/ laboratory/ project				-	
2.4 Year of study	II	2.5 Semester	1	2.6 Type of assessment (E - exam, C - colloquium, V - verification)	C
2.7 Subject category	*DF – fundamentală, DD – în domeniu, DS – de specialitate, DC – complementară*				DC
	DI – Impusă, DOp – opțională, DFac – facultativă				DI

3. Estimated total time

3.1 Number of hours per week	2	of which:	Course	2	Seminars		Laboratory		Project	
3.2 Number of hours per semester	28	of which:	Course	28	Seminars		Laboratory		Project	
3.3 Individual study:										
(a) Manual, lecture material and notes, bibliography										22
(b) Supplementary study in the library, online and in the field										
(c) Preparation for seminars/laboratory works, homework, reports, portfolios, essays										
(d) Tutoring										
(e) Exams and tests										
(f) Other activities:										

3.4 Total hours of individual study (suma (3.3(a)…3.3(f)))	22
3.5 Total hours per semester (3.2+3.4)	50
3.6 Number of credit points	2

4. Pre-requisites (where appropriate)

4.1 Curriculum	Foreign language seminars I, II
4.8 Competence	English language competence, B2 level in CEFRL

5. Requirements (where appropriate)

5.1. For the course	Study of research and journal articles
5.2. For the applications	-

6. Specific competence

6.1 Professional competences	N/A
6.2 Cross competences	**CT3 –** Demonstrating the spirit of initiative and action for updating professional, economical and organizational culture knowledge (1 credit)

7. Discipline objective (as results from the *key competences gained*)

7.1 General objective	Development of integrated skills in an engineering professional context
7.2 Specific objectives	At the end of this course, students should be able to: -Master documenting strategies, information processing; writing according to discourse patterns in specific purposes contexts; - Use strategies for handling difficult written text on a variety of science and academic related topics; - Comprehend and produce discipline appropriate text and genre. - Use lexical and grammar structures at +B2 language competence levels, according to CEFR

8. Contents

8.1 Lectures	Hours	Teaching methods	Notes
Communication theories and its elements. Differences between general/academic/professional communication	2	lecture, problem-based learning, case–study, small group discussions and task solving, assignment discussion	
Word structure: inflected and derivate words. Derivation as a means of creating technical vocabulary.	2		
Phrases: noun headed phrases, verb headed phrases, adjective headed phrases, and preposition headed phrases.	2		
Simple and complex sentences. Frequently used phrase/sentence structures in technical texts: coordination and subordination in finite and non-finite clauses.	2		
Cohesion and coherence in discourse: syntactic parallelism, sentence rephrase, nominalization, lexical choice, emphasis.	2		
Structure of information in paragraphs: general-particular patterns, theme-rheme, hypothesis and validation.	2		
Mid-term evaluation.	2		
Sentence and paragraph. The spelling and punctuation of the formal text.	2		
Text reduction strategies; Paraphrasing	2		
The informative function of science discourse: information structure, impersonal expression, nominalized theme.	2		
Functional and rhetorical organization of written science discourse: genres (textbooks, journal articles and scientific posters).	2		
Formulaic language in science discourse: multifunctional lexical bundles. Interpersonal function of science discourse: hedges, boosters and author mention in science discourse.	2		
Disciplinary variation in science discourse: professional communities, discourse communities. Selecting from language resources according to disciplinary practices.	2		
Final test	2		

Bibliography

1. Munteanu, S.-C (2013) *Academic English for Science and Engineering*. Cluj-Napoca: Casa Cartii de Stiinta. ISBN 978-606-17-0398-2.
2. Swales John M. & Christine B. Feak (2001) *Academic Writing For Graduate Students - Essential Tasks And Skills*, Ann Arbor: The University Of Michigan Press.
3. Hyland Ken (2006) *English For Academic Purposes - An Advanced Resource Book*, London: Routledge
4. Rogers, Louis & Jennifer Wilkin (2013). *Skillful Reading & Writing*. Oxford: Macmillan Education.
5. "The Online Writing Lab" at Purdue University http: //owl.English.purdue.edu/owl
6. "Writing for a Purpose" http: //learnenglish.britishcouncil.org/en/writing-purpose

8.2 Applications – Seminars/Laboratory/Project	Hours	Teaching methods	Notes
-			

Bibliography

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[*] *Se vor preciza, după caz: tematica seminariilor, lucrările de laborator, tematica și etapele proiectului.*

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

Mastering a foreign language will support students in a more flexible integration in the labour market, and have improved personal development. The introduction in the language for specific purposes and academic discourse will facilitate reading and writing more documents in the field

10. Evaluation

Activity type	Assessment criteria	Assessment methods	Weight in the final grade
Course	Assessment completion in due time; Ability to comprehend below and above sentence syntactic and morphologic structures specific to science discourse; to read from sources, to comprehend complex text (journal articles, textbooks); Ability to produce a conference poster based on a published research article	- Multiple choice quizzes - Case-study and practical application of knowledge: Conference poster	mid-term test = 50% final test = 50% total = 100%
Seminar			
Laboratory			
Project			
Minimum standard of performance: Assignment completion, minimum 80% of the midterm evaluation, min 80% of the final evaluation.			

Course responsible
Lecturer dr. Monica Negoescu

Head of department
Conf.univ.dr. Ruxanda Literat

SYLLABUS

1. Data about the program of study

1.1 Institution	The Technical University of Cluj-Napoca
1.2 Faculty	Faculty of Automation and Computer Science
1.3 Department	Computer Science
1.4 Field of study	**Computer Science and Information Technology**
1.5 Cycle of study	Bachelor of Science
1.6 Program of study/Qualification	Computer science/ Engineer
1.7 Form of education	Full time
1.8 Subject code	104.

2. Data about the subject

2.1 Subject name				***Pedagogie II: Teoria și metodologia instruirii. Teoria și metodologia evaluării.***	
2.2 Course responsible/lecturer				Conf. univ. dr. Liana Tăușan	
2.3 Teachers in charge of seminars/ laboratory/ project				Conf. univ. dr. Liana Tăușan	
2.4 Year of study	II	2.5 Semester	1	2.6 Type of assessment (E - exam, C - colloquium, V - verification)	E
2.7 Subject category	*DF – fundamentală, DD – în domeniu, DS – de specialitate, DC – complementară*				DC
	DI – Impusă, DOp – opțională, DFac – facultativă				Dfac

3. Estimated total time

3.1 Number of hours per week	4	of which:	Course	2	Seminars	2	Laboratory		Project	
3.2 Number of hours per semester	56	of which:	Course	28	Seminars	28	Laboratory		Project	
3.3 Individual study:										
(a) Manual, lecture material and notes, bibliography										20
(b) Supplementary study in the library, online and in the field										20
(c) Preparation for seminars/laboratory works, homework, reports, portfolios, essays										25
(d) Tutoring										
(e) Exams and tests										4
(f) Other activities:										

3.4 Total hours of individual study (suma (3.3(a)…3.3(f)))	69
3.5 Total hours per semester (3.2+3.4)	125
3.6 Number of credit points	5

4. Pre-requisites (where appropriate)

4.1 Curriculum	• Psihologia educației • Pedagogie I
4.9 Competence	• Competențe formate ca urmare a studierii disciplinelor Psihologia educației, Pedagogie I

5. Requirements (where appropriate)

5.1. For the course	• Participare activă
5.2. For the applications	• Lectura bibbliografiei recomandate • Documentare suplimentară • Elaborarea şi susţinerea prezentărilor planificate • Participare activă

6. Specific competence

6.1 Professional competences	C1: Proiectarea unor programe de instruire sau educaţionale adaptate pentru diverse niveluri de vârstă/pregătire şi diverse grupuri ţintă; C2: Realizarea activităţilor specifice procesului instructiv-educativ din

	învăţământul gimnazial; C3: Evaluarea proceselor de învăţare, a rezultatelor şi a progresului înregistrat de elevi; C6:Autoevaluarea şi ameliorarea continuă a practicilor profesionale şi a evoluţiei în carieră; C7:Utilizarea metodelor de cercetare științifică și prelucrare a datelor în domeniul educației; C8:Aplicarea caracteristicilor învățământului centrat pe elev în proiectarea, implementarea și evaluarea curriculum-ului școlar;
6.2 Cross competences	CT1 Aplicarea principiilor si a normelor de deontologie profesionala, fundamentate pe optiuni valorice explicite, specifice specialistului în stiintele educatiei CT2 Cooperarea eficienta în echipe de lucru profesionale, interdisciplinare, specifice desfasurarii proiectelor si programelor din domeniul stiintelor educatiei CT3 Utilizarea metodelor si tehnicilor eficiente de învatare pe tot parcursul vietii, în vederea formarii si dezvoltarii profesionale continue CT4: Promovarea valorilor asociate realizării unui învăţământ de calitate, în conformitate cu politicile educaţionale interne şi în acord cu cele elaborate şi popularizate la nivel european, pe baza cunoașterii specificității domeniului educațional european și a interculturalității

7. Discipline objective (as results from the *key competences gained*)

7.1 General objective	• dobândirea unor competențe vizând cunoașterea, interpretarea, prelucrarea și aplicarea problematicii teoriei și metodologiei instruirii și a teoriei și metodologiei evaluării, a modalităţilor de organizare a activității școlare pe principiul calităţii şi valorificării eficiente a resurselor;
7.2 Specific objectives	• cunoaşterea semnificaţiei principalelor concepte din cadrul teoriei și metodologiei instruirii și a teoriei și metodologiei evaluării; dezvoltarea capacităţilor de utilizare a conceptelor; • identificarea corectă a referinţelor empirice ale conceptelor pedagogice şi semnificaţiilor conceptuale ale proceselor de predare-învățare-evaluare; • utilizarea corectă şi în contexte variate a terminologiei specifice teoriei şi metodologiei instruirii și teoriei și metodologiei evaluării; • analizarea modalităților de abordare a procesului de învățământ; • identificarea unor modalităţi de articulare şi integrare a metodelor şi strategiilor de instruire în procesul de învăţământ; • identificarea unor oportunităţi noi de abordare a metodelor şi procedeelor educaţionale din perspectiva elaborării strategiilor de instruire; • operarea cu conceptele, structurile şi tipologiile implicate în activitatea de evaluare şcolară; • propunerea unor metode şi procedee de evaluare corectă, obiectivă şi semnificativă a performanţelor şcolare ale elevilor; • elaborarea unor proiecte educaţionale, bazate pe strategii didactice coerente, care facilitează stilurile individuale de învăţare şi modurile de organizare a procesului de învăţământ; • elaborarea unor modele de proiectare prin aplicarea normativităţii în activităţile didactice; • dezvoltarea motivaţiei pozitive şi a unei atitudini favorabile faţă de profesia didactică, a receptivităţii şi responsabilităţii faţă de schimbările inovatoare din domeniul didacticii generale;

8. Contents

8.1 Lectures	Hours	Teaching methods	Notes
DIDACTICA – TEORIE GENERALĂ A PROCESULUI DE ÎNVĂȚĂMÂNT	2	Prelegere,	

Paradigme și orientări educaționale actuale Didactica – definire, caracteristici, funcții Obiectul de studiu al didacticii Subramurile didacticii Direcții de dezvoltare a didacticii contemporane		Conversaţie, Dezbatere, Suporturi video	
PROCESUL DE ÎNVĂŢĂMÂNT. ABORDAREA SISTEMICĂ Definirea conceptelor: sistem de învăţământ, proces de învăţământ Note definitorii ale procesului de învăţământ Abordarea sistemică a procesului de învăţământ	2	Prelegere, Conversaţie, Dezbatere, Suporturi video	
PROCESUL DE ÎNVĂȚĂMÂNT – CA ACT DE COMUNICARE Comunicarea – concept, structură Forme ale comunicării Comunicarea didactică Definire şi caracteristici ale comunicării didactice Elemente structurale ale comunicării didactice Surse de distorsiune în comunicarea didactică. Eficientizarea comunicării didactice	2	Prelegere, Conversaţie, Dezbatere, Suporturi video	
ABORDAREA INTERACŢIONALĂ A PROCESULUI DE ÎNVĂŢĂMÂNT Predarea – componentă esenţială a procesului de învăţământ (conceptul de predare: semnificaţii tradiţionale şi moderne; forme ale predării; stiluri de predare) Învățarea (conceptele de învăţare şi învăţare şcolară; stiluri de învățare)	2	Prelegere, Conversaţie, Dezbatere, Suporturi video	
SISTEMUL PRINCIPIILOR DIDACTICE Principiile didactice: concept, caracteristici Sistemul principiilor didactice Principiul legării teoriei cu practica Principiul accesibilității (al respectării particularităților de vârstă și individuale) Principiul intuiției (al corelației dintre concret și abstract, dintre senzorial și rațional) Principiul sistematizării și continuității în învățare Principiul participării conștiente și active a elevilor Principiul însușirii temeinice	2	Prelegere, Conversaţie, Dezbatere, Suporturi video	
METODOLOGIA DIDACTICĂ Delimitări conceptuale: tehnologie didactică, metodologie didactică, strategie didactică, metodă de învățământ, procedeu didactic Tendințe actuale privind metodologia didactică Metodele de învățământ Metode de comunicare și dobândire a valorilor socioculturale Metode de explorare sistematică a realității obiective Metode fundamentate pe acțiune practică Metode de raționalizare a conținuturilor și operațiilor de predare/ învățare	6	Prelegere, Conversaţie, Dezbatere, Suporturi video	
MIJLOACELE DE ÎNVĂŢĂMÂNT Conceptul de mijloace de învăţământ Funcţiile mijloacelor de învăţământ Taxonomia mijloacelor de învăţământ; Cerinţe de selectare şi utilizare a mijloacelor de învăţământ.	2	Prelegere, Conversaţie, Dezbatere, Suporturi video	
LECŢIA – FORMĂ DE BAZĂ A ORGANIZĂRII PROCESULUI DE ÎNVĂŢĂMÂNT Varietatea formelor de organizare a procesului de învăţământ: concept, evoluție, clasificare Lecţia – formă fundamentală a organizării procesului de învăţământ Definirea lecției Valențe și critici ale lecției Variabile și cerințe pedagogice ale lecției	2	Prelegere, Conversaţie, Dezbatere, Suporturi video	

Tipuri fundamentale de lecţii			
EVALUAREA ÎN PROCESUL DE ÎNVĂŢĂMÂNT Definirea şi analiza conceptelor: evaluare, măsurare, apreciere. Funcţiile evaluării Forme de evaluare a rezultatelor şi progreselor şcolare: evaluarea iniţială evaluarea finală (sumativă) evaluarea formativă (continuă) Metode şi tehnici de evaluare a rezultatelor şi progreselor şcolare Erori în evaluarea şcolară. Modalităţi de corectare.	4	Prelegere, Conversaţie, Dezbatere, Suporturi video	
PROIECTAREA DIDACTICĂ Proiectarea didactică: concept, caracteristici. Modelul tradiţional/modelul curricular al proiectării Etapele proiectării pedagogice Condiţiile unei proiectări pedagogice eficiente Demersurile proiectării didactice la nivel micro Lectura personalizată a programei şi a manualelor şcolare Planificarea calendaristică Proiectarea secvenţială a unităţilor de învăţare Proiectarea lecţiilor/ activităţilor didactice	4	Prelegere, Conversaţie, Dezbatere, Suporturi video	
Bibliography			

8.2 Applications – Seminars/Laboratory/Project	Hours	Teaching methods	Notes
Didactica tradițională /didactica modernă. Centrarea pe elev – obiectiv al didacticii moderne.	2	Prezentări, dezbateri, studii de caz	
Abordarea sistemică a procesului de învățământ: componentele procesului de învățământ și relațiile dintre ele.	2	Prezentări, dezbateri, studii de caz	
Comunicarea didactică: elemente structurale, retroacțiuni, surse de distorsiuni, modalități de eficientizare a comunicării didactice.	2	Prezentări, dezbateri, studii de caz	
Interacțiunea proceselor de predare-învățare-evaluare. Condițiile predării eficiente. Condițiile învățării.	2	Prezentări, dezbateri, studii de caz	
Moduri concrete de aplicare a principiilor didactice pe diverse situații de instruire.	2	Prezentări, dezbateri, studii de caz	
Metode de comunicare, metode de explorare a realității, metode bazate pe acțiune practică, metode de raționalizare a conținuturilor – caracteristici, avantaje, limite, exemplificări	4	Prezentări, dezbateri, studii de caz	
Metode interactive, metode de dezvoltare a gândirii critice – caracteristici, exemplificări	4	Prezentări, dezbateri, studii de caz	
Cerinţe pedagogice impuse de desfăşurarea unei lecţii eficiente. Modalităţi de modernizare a lecţiei.	2	Prezentări, dezbateri, studii de caz	
Testul docimologic – cerințe, exemplificări	2	Prezentări, dezbateri, studii de caz	
Modalități practice de atenuare a erorilor în evaluare.	2	Prezentări, dezbateri, studii de caz	
Condiții ale unei proiectări didactice eficiente. Exerciții de proiectare didactică: planificare calendaristică, proiectarea unității de învățare, proiectarea lecției.	2	Prezentări, dezbateri, studii de caz	
Evaluare portofoliu seminar	2	Evaluare prin portofoliu	

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*Se vor preciza, după caz: tematica seminariilor, lucrările de laborator, tematica și etapele proiectului.

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

10. Evaluation

Activity type	Assessment criteria	Assessment methods	Weight in the final grade
Course	Volumul şi corectitudinea cunoştinţelor	Evaluare orală	40
	Rigoarea ştiinţifică a limbajului	Evaluare orală	10
	Organizarea conţinutului	Evaluare orală	10
	Originalitatea	Evaluare orală	10
Seminar	Susţinerea unui referat	Fişă de evaluare seminar	20
	Participare activă la seminarii	Fişă de evaluare seminar	10
Laboratory			
Project			
Minimum standard of performance: 50% rezultat după însumarea punctajelor ponderate			

Course responsible
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Prof.dr.ing. Rodica Potolea