

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 | 8. |

2. Data about the subject

| | | | | | |
|--|--|--------------|---|---|----|
| 2.1 Subject name | Mathematical analysis II (Integral calculus and differential equations) | | | | |
| 2.2 Course responsible/lecturer | Prof. dr. Dumitru Mircea Ivan - mircea.ivan@math.utcluj.ro | | | | |
| 2.3 Teachers in charge of seminars/ laboratory/ project | Assoc.prof.dr. Mircea Rus – rus.mircea@math.utcluj.ro | | | | |
| 2.4 Year of study | I | 2.5 Semester | 2 | 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 | | | | | | | | | | 20 |
| (d) Tutoring | | | | | | | | | | 5 |
| (e) Exams and tests | | | | | | | | | | 4 |
| (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 | Basic knowledge Integral Calculus |
| 4.2 Competence | Competences in elementary Integral Calculus: primitives, definite integrals. |

5. Requirements (where appropriate)

| | |
|---------------------------|----------------|
| 5.1. For the course | Videoprojector |
| 5.2. For the applications | Videoprojector |

6. Specific competence

| | |
|------------------------------|--|
| 6.1 Professional competences | <p>C1 – Operating with basic Mathematical, Engineering and Computer Science concepts</p> <p>C1.1 - Recognizing and describing specific concepts to calculability, complexity, programming paradigms and modeling of computing and communication systems</p> <p>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</p> |
|------------------------------|--|

| | |
|-----------------------|--|
| | 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 integral calculus. |
| 7.2 Specific objectives | Use of the integral calculus in order to solve problems in engineering. |

8. Contents

| 8.1 Lectures | Hours | Teaching methods | Notes |
|---|-------|------------------|------------------------|
| Ordinary differential equations (ODE) of order one | 2 | Explanation | |
| Linear homogeneous ODE with constant coefficients | 2 | | |
| Linear non-homogeneous ODE with constant coefficients | 2 | | |
| Positive and linear functionals. | 2 | | |
| Riemann-Stieltjes integral. Primitives. | 2 | | |
| Improper integrals. | 2 | | |
| Integrals depending on parameters. | 2 | | Demonstration |
| Special functions | 2 | | |
| Paths. Vector fields. Line integrals with respect to the coordinates. Circulation. | 2 | | Collaboration |
| Differential Forms. Exact differential forms. Path-independence. Work. | 2 | | Interactive activities |
| Line integrals with respect to the arc length. Total mass, center of mass. | 2 | | |
| Double integral. Green-Riemann formula. | 2 | | |
| Surface integral. Flux of vector field across a surface. Stokes' Theorem. | 2 | | |
| Volume integral. Gauss-Ostrogradsky Theorem. MATHEMATICA capabilities. | 2 | | |
| Bibliography | | | |
| 1. Mircea Ivan. Elemente de calcul integral. Mediamira, Cluj-Napoca, 2003. ISBN 973-9357-40-7. | | | |
| 2. Dumitru Mircea Ivan. Calculus. Editura Mediamira, Cluj-Napoca, 2002. ISBN 973-9358-88-8. | | | |
| 8.2 Applications – Seminars/Laboratory/Project | Hours | Teaching methods | Notes |
| Ordinary differential equations (ODE) of order one (Exercises) | 2 | Explanation | |
| Linear homogeneous ODE with constant coefficients (Exercises) | 2 | | |
| Linear non-homogeneous ODE with constant coefficients (Exercises) | 2 | | |
| Positive and linear functionals (Exercises) | 2 | | |
| Riemann-Stieltjes integral. Primitives (Exercises) | 2 | | |
| Improper integrals (Exercises) | 2 | | |
| Integrals depending on parameters(Exercises) | 2 | | Demonstration |
| Special functions (Exercises) | 2 | | |
| Line integrals with respect to the coordinates(Exercises) | 2 | | Collaboration |
| Differential Forms (Exercises) | 2 | | Interactive activities |
| Line integrals with respect to the arc length. (Exercises) | 2 | | |
| Double integral. Green-Riemann formula. (Exercises) | 2 | | |
| Surface integral. (Exercises) | 2 | | |
| Volume integral. MATHEMATICA related capabilities. (Exercises) | 2 | | |
| Bibliography | | | |
| 1. Dumitru Mircea Ivan, et al. Analiză matematică - Culegere de probleme pentru seminarii, examene și concursuri. Editura Mediamira, Cluj-Napoca, 2002. ISBN 973-9357-20-2. | | | |
| 2. Mircea Ivan et al. Culegere de Probleme Pentru Seminarii, Examene și Concursuri. UT Press, Cluj-Napoca, 2000. | | | |

*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. Mircea Ivan

Head of department
Prof.dr.eng. Rodica Potolea

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| 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 | 9. |

2. Data about the subject

| | | | | | |
|--|---|--------------|---|---|----|
| 2.1 Subject name | Assembly Language Programming | | | | |
| 2.2 Course responsible/lecturer | Assoc. Prof. dr. eng. Emil Cebuc- Emil.Cebuc@cs.utcluj.ro | | | | |
| 2.3 Teachers in charge of seminars/ laboratory/ project | Assoc. Prof. dr. eng. Emil Cebuc- Emil.Cebuc@cs.utcluj.ro As. Dr. Ing. Dragos Lisman - dragos.lisman@mecon.utcluj.ro Ing. Bogdan Laslo - bogdan.laslo@emerson.com | | | | |
| 2.4 Year of study | I | 2.5 Semester | 2 | 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 | | | | DS |
| | 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 | | | | | | | | | | 17 |
| (c) Preparation for seminars/laboratory works, homework, reports, portfolios, essays | | | | | | | | | | 10 |
| (d) Tutoring | | | | | | | | | | 4 |
| (e) Exams and tests | | | | | | | | | | 3 |
| (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 | None |
| 4.3 Competence | None |

5. Requirements (where appropriate)

| | |
|---------------------------|--|
| 5.1. For the course | Projector, Blackboard |
| 5.2. For the applications | PC with 32 bit operating system , 1 PC per student, DOSBox |

6. Specific competence

| | |
|------------------------------|--|
| 6.1 Professional competences | 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 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 | Knowledge of Microprocessor structure and low level programming |
| 7.2 Specific objectives | Is able to use various addressing modes, assembly language programming techniques, use specific programming tools |

8. Contents

| 8.1 Lectures | Hours | Teaching methods | Notes |
|---|-------|---|-------|
| C1. Introduction, data representation | 2 | PowerPoint presentations, Examples of Program listings, lecture | |
| C2. ISAx86 Architecture, addressing modes | 2 | | |
| C3. x86 Instruction format | 2 | | |
| C4. MASM x86 directives ALP program prototypes | 2 | | |
| C5. ISA x86 Instruction set – data transfer, address transfer arithmetic and logical instructions | 2 | | |
| C6. ISA x86 Instruction set – shift, rotate, flow control instructions | 2 | | |
| C7. ISA x86 Instruction set – 386, software interrupt, string instructions | 2 | | |
| C8. Coprocessor structure and operation, data transfer, arithmetic instructions | 2 | | |
| C9. Coprocessor math functions, misc. instructions | 2 | | |
| C10. MMX extensions – MMX calculus, MMX instructions | 2 | | |
| C11. Protected mode operations, memory management, segmentation, privilege levels | 2 | | |
| C12. System function calls | 2 | | |
| C13. Multiple module programs | 2 | | |
| C14. Program optimisation | 2 | | |
| Bibliography | | | |
| 1. PPT lecture notes at: ftp://ftp.utcluj.ro/pub/users/cemil/ALP | | | |
| 2. D. Gorgan, G. Sebestyen, "Proiectarea calculatoarelor", Editura albastra, 2005, | | | |
| 3. R. Hyde R. Hyde, "AoA - The Art of Assembly language", la adresa: webster.cs.ucr.edu/AoA/DOS/pdf/ | | | |
| 4. S. Nedevschi, "Microprocesoare", Editura UTCN, 1994 | | | |
| 8.2 Applications – Seminars/Laboratory/Project | Hours | Teaching methods | Notes |
| L1. Information Representation | 2 | Interactive tutoring, learn by example | |
| L2. Tools, ISA x86 Architecture, addressing modes | 2 | | |
| L3. Addressing Modes and address calculus | 2 | | |
| L4. Pseudo instruction Usage | 2 | | |
| L5. ISA x86: Instructions data transfer, arithmetical and logical | 2 | | |
| L6. ISA x86: Instructions: shift and rotate | 2 | | |
| L7. ISA x86: Instructions: flow control, other instructions | 2 | | |
| L8. Real number | 2 | | |
| L9. Complex operations | 2 | | |
| L10. Multimedia operations | 2 | | |
| L11. Program optimisation | 2 | | |
| L12. System function call | 2 | | |
| L13. Advanced programming techniques | 2 | | |
| L14. Colloquium | 2 | | |
| Bibliography | | | |
| Art of assembly language, Randall Hyde available at: ftp://ftp.utcluj.ro/pub/users/cemil/asm/ | | | |
| Lab Workbook, Emil Cebuc et. All. Available at: ftp://ftp.utcluj.ro/pub/users/cemil/asm/labs/ | | | |

**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

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|--|
| Course and lab contents are discussed and compared to similar courses in other universities and with software companies like Bitdefender |
|--|

10. Evaluation

| Activity type | Assessment criteria | Assessment methods | Weight in the final grade |
|--|--|--|---------------------------|
| Course | Knows microprocessor structure, number representation, x86 basic instruction set, system function calls and assembly program structure | Midterm written exam Final Oral exam Admittance to final exam conditioned by successful lab colloquium | 2/9 4/9 |
| Seminar | | | |
| Laboratory | Is able to develop a medium size program using specific tools | Lab Colloquium | 3/9 |
| Project | | | |
| Minimum standard of performance: Is able to develop a medium size interactive assembly language program using specific tools Grade calculus: 22% midterm +33 % lab + 45% final exam Conditions for participating in the final exam: Lab \geq 5 Conditions for promotion: final exam \geq 5 | | | |

Course responsible
Conf. dr. Emil Cebuc

Head of department
Prof.dr.eng. Rodica Potolea

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1. Data about the program of study

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|------------------------------------|--|
| 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 | 10. |

2. Data about the subject

| | | | | | |
|---|--|---|---|---|----|
| 2.1 Subject name | | Electrotechnics | | | |
| 2.2 Course responsible/lecturer | | Assoc. prof. dr. eng. Laura Darabant – Laura.Darabant@et.utcluj.ro | | | |
| 2.3 Teachers in charge of seminars/ laboratory/ project | | Assoc. prof. dr. eng. Laura Darabant – Laura.Darabant@et.utcluj.ro | | | |
| 2.4 Year of study | I | 2.5 Semester | 2 | 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 | 3 | Seminars | | Laboratory | 1 | Project | |
| 3.2 Number of hours per semester | 56 | of which: | Course | 42 | Seminars | | Laboratory | 14 | 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 | | | | | | | | | 20 | |
| (d) Tutoring | | | | | | | | | 6 | |
| (e) Exams and tests | | | | | | | | | 3 | |
| (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 | Mathematics I, II; Physics |
| 4.4 Competence | N/A |

5. Requirements (where appropriate)

| | |
|---------------------------|--------------------------------------|
| 5.1. For the course | N/A |
| 5.2. For the applications | The presence of the lab is mandatory |

6. Specific competence

| | |
|------------------------------|--|
| 6.1 Professional competences | <p>C1 – Operating with basic Mathematical, Engineering and Computer Science concepts</p> <p>C1.1 – Recognizing and describing concepts that are specific to the fields of calculability, complexity, programming paradigms, and modeling computational and communication systems</p> <p>C1.2 – Using specific theories and tools (algorithms, schemes, models, protocols,</p> |
|------------------------------|--|

| | |
|-----------------------|--|
| | 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 |
| 6.2 Cross competences | N/A |

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

| | |
|-------------------------|---|
| 7.1 General objective | Operating with basic concepts of electrical engineering |
| 7.2 Specific objectives | 1. Acquiring theoretical knowledge's regarding electrotechnics. 2. Acquiring practical skills regarding electrical circuits. |

8. Contents

| 8.1 Lectures | Hours | Teaching methods | Notes |
|--|-------|--|-------|
| Electric and magnetic quantities. Static electric and magnetic fields (the electric field in free space and in material, electric current, the magnetic field in free space and in material) | 3 | Multimedia, PowerPoint Presentations, Demonstration board | |
| Laws and theorems of electromagnetic field | 3 | | |
| Electrical capacitance, energy and forces | 3 | | |
| Magnetic circuits. Self-inductance and mutual inductance. Magnetic energy and forces. | 3 | | |
| Basic concepts, units and laws of circuit theory (characteristic values, power in sinusoidal regime, representation of sinusoidal functions by vectors and complex numbers) | 3 | | |
| The characterisation of the linear circuits in complex plane, the complex form of some theorems | 3 | | |
| Equivalent impedances (series and parallel connection, without mutual inductance, with mutual inductance, real condenser, real inductance, air core transformer) | 3 | | |
| Resonance (in series, parallel, real, inductively coupled circuits, power factor improvement) | 3 | | |
| Two-port networks (equations, equivalent circuits, open-circuit and short-circuit tests, characteristic impedance, propagation constant, filters) | 3 | | |
| Network theorems (th superposition theorem, Thevenin-Norton theorem, mesh or loop analysis, node analysis, matrix methods) | 3 | | |
| Transient regime of linear circuits (continuity conditions, transient behaviour of the R-L, R-C and R,L,C) | 3 | | |
| Transient regime of linear circuits (the Laplace transform, Duhamel integral, state variable method) | 3 | | |
| Study-state periodic non-sinusoidal regime (Fourier expansion, power, network analysis) | 3 | | |
| Transmission lines (the primary line parameters, the equations of the transmission line, voltage and current waves on long lines, distortionless lines) | 3 | | |
| Bibliography | | | |
| 1. The Theory of Electric Circuits, authors: RV Ciupa, V. Țopa, Casa Cartii de Stiinta Publishing House, 2003, ISBN 973-9204-98-8 | | | |
| 2. Simion, E., Maghiar, T., <i>Electrotehnica</i> , E.D.P., București, 1982 | | | |
| 3. Mocanu, C. I., <i>Teoria câmpului electromagnetic</i> , E.D.P., București, 1981 | | | |
| 8.2 Applications – Seminars/Laboratory/Project | Hours | Teaching methods | Notes |
| Determination of the spectrum and equipotential surfaces of an | 1 | Practical exercises | |

| | | | |
|---|---|--|--|
| electric field using a electrokinetic model | | | |
| The study of a magnetic circuit. The measurement of the iron losses using an oscilloscope | 1 | | |
| Representation of sinusoidal functions by vectors and complex numbers | 1 | | |
| Analysis of the R,L,C series and parallel circuits, of the voltage and current resonances | 1 | | |
| Power transfer in inductively coupled circuits | 1 | | |
| The study of a circuit in non-sinusoidal regime | 1 | | |
| The study of the transient regime, methods for solving circuits in transient regime | 1 | | |
| Bibliography | | | |
| 1. Răduleț, R., <i>Bazele electrotehnicii. Probleme.</i> , E.D.P., București, 1981 | | | |
| 2. Dan Doru Micu, Laura Darabant , Denisa Stet, Mihaela Cretu, Andrei Ceclan, Levente Czumbil, Teoria circuitelor electrice. Probleme, UT Press, Cluj-Napoca, 978-606-737-140-6, 2016, 280 pagini; | | | |

*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

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10. Evaluation

| Activity type | Assessment criteria | Assessment methods | Weight in the final grade |
|---|---------------------|--|---------------------------|
| Course | | Three hours written examination, written test (WT) | 0.8 WT |
| Seminar | | | |
| Laboratory | | Laboratory works (LW) | 0.2 LW |
| Project | | | |
| Minimum standard of performance: N=0,8 WT + 0,2 LW Pass conditions: : N \geq 5; LW \geq 5 | | | |

Course responsible
Assoc.prof.dr.eng. Laura Darabant

Head of department
Prof.dr.eng. Rodica Potolea

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1. Data about the program of study

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|------------------------------------|--|
| 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 | 11. |

2. Data about the subject

| | | | | | |
|---|--|---|---|---|----|
| 2.1 Subject name | | Digital Systems Design | | | |
| 2.2 Course responsible/lecturer | | Prof. dr. eng. Creț Octavian Augustin – Octavian.Cret@cs.utcluj.ro | | | |
| 2.3 Teachers in charge of seminars/ laboratory/ project | | As.Drd.Ing. Diana Irena Pop – Diana.Pop@cs.utcluj.ro Dipl. eng. Mihai Timar – mitis2010@gmail.com | | | |
| 2.4 Year of study | I | 2.5 Semester | 2 | 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 | 3 | Seminars | | Laboratory | 2 | Project | |
| 3.2 Number of hours per semester | 70 | of which: | Course | 42 | 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 | | | | | | | | | | 17 |
| (d) Tutoring | | | | | | | | | | 6 |
| (e) Exams and tests | | | | | | | | | | 9 |
| (f) Other activities: | | | | | | | | | | 0 |
| 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 | Logic Design |
| 4.5 Competence | At least one high level programming language (i.e. C or PASCAL) |

5. Requirements (where appropriate)

| | |
|---------------------------|--|
| 5.1. For the course | A minimum of 75% course attendance rate is mandatory for being admitted to the final exam. |
| 5.2. For the applications | Preliminary preparation of summaries from the indicated bibliography (laboratory textbook) |

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 | <ul style="list-style-type: none"> The main objective of this discipline is to give to the students the bases of Digital Systems Design, in order to make them able to analyze, design and implement any complex digital system. |
| 7.2 Specific objectives | <p>To reach this goal, students will learn to:</p> <ul style="list-style-type: none"> Apply Digital System Design principles and descriptive techniques; Understand various aspects of Automata Theory with applications in the field of Digital Systems Design; Describe any digital system in VHDL; Utilize programmable devices such as FPGAs and PLDs to implement digital systems. |

8. Contents

| 8.1 Lectures | Hours | Teaching methods | Notes |
|---|-------|---|-------|
| VHDL hardware description language – basic design units, signals | 3 | Blackboard presentation discussions | |
| VHDL hardware description language – generics, constants, operators, data types, attributes | 3 | | |
| VHDL hardware description language – sequential domain | 3 | | |
| VHDL hardware description language – concurrent domain | 3 | | |
| Creating testbenches for simulating and testing circuits in VHDL | 3 | | |
| Automata (Finite State Machines) Theory – classification, definitions, formal models | 3 | | |
| Microprogramming | 3 | | |
| Microprogrammed Devices | 3 | | |
| Designing Synchronous Automata | 3 | | |
| Analysis and Design (Synthesis) of Asynchronous Automata (I) | 3 | | |
| Analysis and Design (Synthesis) of Asynchronous Automata (II) | 3 | | |
| Automata Identification | 3 | | |
| Lossless Machines | 3 | | |
| Linear Automata | 3 | | |
| Bibliography | | | |
| <ol style="list-style-type: none"> Digital Design Principles and Practices, John F. Wakerly, Prentice-Hall, 2000. Automate programabile, Th. Borangiu, R. Dobrescu, Ed. Academiei, 1986. Advanced Digital Logic Design Using VHDL, State Machines, and Synthesis for FPGA's, Sunggu Lee, Thomson-Engineering; 1 edition (April 25, 2005), ISBN 0534466028. PowerPoint slides for VHDL and Automata Theory lectures + sets of problems for the individual study: http://users.utcluj.ro/~lucia/index.html | | | |
| 8.2 Applications – Seminars/Laboratory/Project | Hours | Teaching methods | Notes |
| Introduction to VHDL | 2 | Practical work on test boards, FPGA boards, specialized software, blackboard presentations, supplemental explanations and discussions | |
| Basic design units in VHDL | 2 | | |
| Signals, generics, constants, in VHDL | 2 | | |
| Operators, data types in VHDL | 2 | | |
| Attributes in VHDL | 2 | | |
| Sequential domain. Processes in VHDL | 2 | | |
| Sequential statements in VHDL | 2 | | |
| Concurrent domain in VHDL | 2 | | |
| Concurrent statements in VHDL | 2 | | |

| | | | |
|--|---|--|--|
| Sub-programs in VHDL | 2 | | |
| Testbenches in VHDL | 2 | | |
| Standard and predefined packages in VHDL | 2 | | |
| Mini-projects delivery | 2 | | |
| Lab test | 2 | | |
| Bibliography | | | |
| 1. Limbajul VHDL, Îndrumător de laborator, Ediția a-3-a. O. Creț, L. Văcariu, Ed. U.T. Press, Cluj-Napoca, 2007. | | | |
| 2. PowerPoint slides for VHDL and Automata Theory lectures + sets of problems for the individual study: http://users.utcluj.ro/~lucia/index.html | | | |

**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

- Since this discipline is a basic one in Computer Science, its content is “classic” but also modern because it familiarizes students with the modern principles of Logic Design (utilization of modern simulation and synthesis tools, FPGA and CPLD-based design etc.). Its contents have been discussed with major academia and industry actors from Romania, Europe and U.S.A. and it has been evaluated several times by Romanian Governmental Agencies like CNEAA and ARACIS.

10. Evaluation

| Activity type | Assessment criteria | Assessment methods | Weight in the final grade |
|--|---|---------------------------------|---------------------------|
| Course | Problems solving abilities Presence, (Inter)activity | Written Exam | 60% |
| Homeworks | Problems solving abilities | Practical Evaluation | 20% |
| Laboratory | Problems solving abilities Presence, (Inter)activity | Practical Evaluation (hands-on) | 20% |
| Project | | | |
| Minimum standard of performance: Modeling and solving typical Digital Systems Design problems using the domain-specific formal apparatus. Grade calculus: 20% lab + 20% miniproject + 60% final exam Conditions for participating in the final exam: Lab \geq 5, Project \geq 5 Conditions for promotion: final exam \geq 5 For participating in the final written exam minimum of 80% course attendance rate is necessary. | | | |

Course responsible
Prof.dr.eng. Octavian Cret

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 | 12. |

2. Data about the subject

| | | | | | |
|--|--|---|---|---|----|
| 2.1 Subject name | | Data Structures and Algorithms | | | |
| 2.2 Course responsible/lecturer | | Lect. dr. eng. Marius Joldoș – Marius.Joldos@cs.utcluj.ro | | | |
| 2.3 Teachers in charge of seminars/ laboratory/ project | | As.dr.eng. Ciprian Pocol – Ciprian.Pocol@cs.utcluj.ro | | | |
| 2.4 Year of study | I | 2.5 Semester | 2 | 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 | 3 | Seminars | | Laboratory | 2 | Project | |
| 3.2 Number of hours per semester | 70 | of which: | Course | 42 | Seminars | | Laboratory | 28 | Project | |
| 3.3 Individual study: | | | | | | | | | | |
| (a) Manual, lecture material and notes, bibliography | | | | | | | | | | 30 |
| (b) Supplementary study in the library, online and in the field | | | | | | | | | | 25 |
| (c) Preparation for seminars/laboratory works, homework, reports, portfolios, essays | | | | | | | | | | 10 |
| (d) Tutoring | | | | | | | | | | 10 |
| (e) Exams and tests | | | | | | | | | | 5 |
| (f) Other activities: | | | | | | | | | | 0 |
| 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 | Computer Programming course |
| 4.6 Competence | Programming in C |

5. Requirements (where appropriate)

| | |
|---------------------------|--|
| 5.1. For the course | |
| 5.2. For the applications | |

6. Specific competence

| | |
|------------------------------|---|
| 6.1 Professional competences | <p>C1 – Operating with basic Mathematical, Engineering and Computer Science concepts</p> <p>C1.1 – Recognizing and describing concepts that are specific to the fields of calculability, complexity, programming paradigms, and modeling computational and communication systems</p> <p>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</p> |
|------------------------------|---|

| | |
|-----------------------|--|
| | 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 |
| 6.2 Cross competences | N/A |

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

| | |
|-------------------------|--|
| 7.1 General objective | To acquaint the students with a wide range of fundamental algorithms and data structures. To learn how to use general methods for development of algorithms, as well as mathematical tools for analyzing the correctness and efficiency of algorithms. |
| 7.2 Specific objectives | <ul style="list-style-type: none"> • To choose the appropriate data structure for modelling a given problem. • To compare and contrast the cost and benefits of dynamic and static structure implementations. • To compare iterative and recursive solutions for elementary problems. • To determine when a recursive solution is appropriate for a problem. • To determine the time and space complexity of simple algorithms and recursively defined algorithms. • To design and implement algorithms using development techniques such as: greedy, divide-and-conquer, backtracking, dynamic programming, branch and bound. • To write C programs that use data structures such as: arrays, linked lists, stacks, queues, trees, hash tables, and graphs. • To implement in C the most common sorting algorithms. |

8. Contents

| 8.1 Lectures | Hours | Teaching methods | Notes |
|---|-------|---------------------------------|------------------------|
| About the course (objectives, outline, recommended reading). Problem solving. Notions of Algorithmics (growth of functions, efficiency, programming model). Stacks, queues. Lists | 3 | Lectures, demos and discussions | Uses a video-projector |
| More on lists. Implementation issues. | 3 | | |
| Trees – definitions, traversals. ADT Tree. Implementations. Binary Search Trees. | 3 | | |
| Sets ADTs and Implementations. Dictionary ADT. Hash Tables. Mapping ADT. | 3 | | |
| Priority Queue ADT. Tries | 3 | | |
| Advanced Set Representation Methods. AVL trees. 2-3 Trees. Union-Find Set ADT. | 3 | | |
| Directed Graphs. Definitions. Representations. ADT's. Single Source Shortest Path Problem (Dijkstra, Bellman-Ford, Floyd-Warshall). Traversals for DGs. Parenthesis Lemma. DAGs. Topological Sort | 3 | | |
| Undirected Graphs. Terminology. Free Trees. Graph Representations. Graph Traversals (depth-first, breadth-first). Articulation points & Biconnected Components. | 3 | | |
| Algorithm Design Techniques I. Brute Force Algorithms. Greedy Algorithms. | 3 | | |
| Algorithm Design Techniques I. Divide-and-Conquer. | 3 | | |
| Algorithm Design Techniques II. Dynamic Programming. | 3 | | |
| Algorithm Design Techniques III. Backtracking. Search Tree Strategies (branch and bound) | 3 | | |
| Algorithm Design Techniques IV. Search Tree Strategies (branch and bound). Local Search. | 3 | | |
| Internal Sorting | 3 | | |

| | | | |
|--|-------|---|---|
| Bibliography | | | |
| 1. Aho, Hopcroft, Ullman. Data Structures and Algorithms, Addison-Wesley, 427 pages, 1987. | | | |
| 2. Cormen, Leiserson, Rivest, Stein: Introduction to Algorithms, 2nd edition. MIT Press / McGraw Hill, 1028 pages, 2001. | | | |
| 3. Preiss, Bruno. Data Structures and Algorithms with object-Oriented Design Patterns in C++, John Wiley and Sons, 660 pages, 1999 (freely available on the Web) | | | |
| 8.2 Applications – Seminars/Laboratory/Project | Hours | Teaching methods | Notes |
| Review of C Programming. | 2 | Tutoring, discussions, and assisted program development | PCs equipped with MinGW C and Code-blocks IDE |
| Singly-linked Lists, Stacks and Queues.(Array-based and Dynamic Allocation Implementations) | 2 | | |
| Doubly Linked and Circular Lists | 2 | | |
| Arbitrary Trees. Binary Trees | 2 | | |
| Binary Search Trees | 2 | | |
| Hash Tables. | 2 | | |
| Laboratory Test 1 | 2 | | |
| Graph Representations and Traversals (BFS, DFS and applications) | 2 | | |
| Algorithm Design I. Greedy | 2 | | |
| Algorithm Design II. Divide & Conquer | 2 | | |
| Algorithm Design III. Dynamic Programming and Heuristics. | 2 | | |
| Algorithm Design IV Backtracking and Branch and Bound | 2 | | |
| Review. Evaluation of extra-credit problems | 2 | | |
| Laboratory Test 2 | 2 | | |
| Bibliography | | | |
| 1. Moodle course Web 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.

10. Evaluation

| Activity type | Assessment criteria | Assessment methods | Weight in the final grade |
|--|--|---|---------------------------|
| Course | The understanding of the concepts taught and the ability to solve problems | Three in-class tests (T) + Final Written exam (W) | 65% = 50% W + 15% T |
| Seminar | | | |
| Laboratory | Quality of the assigned applications | Analysis and evaluation of the solved assignments | 35% |
| Project | | | |
| Minimum standard of performance: Grade calculus: 10% midterm + 35% laboratory + 55% final exam Conditions for participating in the final exam: Laboratory ≥ 5 Conditions for promotion: grade ≥ 5 | | | |

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

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 | 13. |

2. Data about the subject

| | | | | | |
|--|--|---|---|---|----|
| 2.1 Subject name | | English II | | | |
| 2.2 Course responsible/lecturer | | - | | | |
| 2.3 Teachers in charge of seminars/ laboratory/ project | | Conf.dr. Sonia Munteanu – Sonia.Munteanu@lang.utcluj.ro Asist.dr. Monica Negoescu, Negoescu@mail.utcluj.ro | | | |
| 2.4 Year of study | I | 2.5 Semester | 2 | 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 | | Seminars | 2 | Laboratory | | Project | |
| 3.2 Number of hours per semester | 28 | of which: | Course | | Seminars | 28 | Laboratory | | Project | |
| 3.3 Individual study: | | | | | | | | | | |
| (a) Manual, lecture material and notes, bibliography | | | | | | | | | | |
| (b) Supplementary study in the library, online and in the field | | | | | | | | | | |
| (c) Preparation for seminars/laboratory works, homework, reports, portfolios, essays | | | | | | | | | | 22 |
| (d) Tutoring | | | | | | | | | | |
| (e) Exams and tests | | | | | | | | | | |
| (f) Other activities: | | | | | | | | | | |
| 3.4 Total hours of individual study (suma (3.3(a)...3.3(f))) | | | | | | 25 | | | | |
| 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 | Completion of FL_I seminar |
| 4.7 Competence | Minimum B2 level (CEFR) |

5. Requirements (where appropriate)

| | |
|---------------------------|--|
| 5.1. For the course | N/A |
| 5.2. For the applications | Class attendance, individual study and homework completion |

6. Specific competence

| | |
|------------------------------|--|
| 6.1 Professional competences | N/A |
| 6.2 Cross competences | CT2 – Identifying, describing and conducting processes in the projects management field, assuming different roles inside the team and clearly and concisely describing, verbally or in writing, in Romanian and in an international language, the own results from the activity field |

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

| | |
|-------------------------|--|
| 7.1 General objective | Students should acquire knowledge and oral skills to communicate in English in professional (technical and engineering) contexts and on job related topics. |
| 7.2 Specific objectives | At the end of this seminar, the students will be able to: <ul style="list-style-type: none"> - Organize information for oral presentation; - Evaluate audience and adapt spoken discourse to current informational and linguistic needs; - Prepare and deliver a short presentation on a work/professional/own interest related topic; - Use linguistic and paralinguistic means to various purposes and needs within their field of interest or profession. |

8. Contents

| 8.1 Lectures | Hours | Teaching methods | Notes |
|---|-------|---|-------|
| - | | | |
| Bibliography | | | |
| - | | | |
| 8.2 Applications – Seminars/Laboratory/Project | Hours | Teaching methods | Notes |
| Describing purpose of oral communication in work/professional related contexts; understanding and differentiating informative talks, persuasive talks, descriptive and argumentative talks. | 2 | Presentation of content, viewing professional presentations and observing structure and approach, case-based discussion, peer evaluation, small projects-based learning | |
| Assessing, predicting and describing audience needs and expectations. | 2 | | |
| Formulating and prioritizing communicative goals: relating to audience expectations. | 2 | | |
| Organizing information and structuring ideas: leading information vs details, supporting info and exemplifying, supplementary info. Introduction, body conclusion Q&A presentation format. | 2 | | |
| Preparing for speaking to an audience: introducing self, purpose of talk, previewing info and stating policy on questions. | 2 | | |
| Controlling voice and spoken production: prosody of language: word and sentence stress, pace, rhythm and intonation. | 2 | | |
| Using language to make an impact: parallel structures, tripling, cumulative structures; coordination with voice and body language. | 2 | | |
| Preparing visual aid: PP slides – dos and donts; technical visual support (graphs, tables, etc.). | 2 | | |
| Introducing, describing and interpreting visual support data: talking about numerical data, describing trends in graphs/tables, summarizing and/or pointing to relevant numerical values/data. | 2 | | |
| Presenting narrative data. Sequence markers and syntactic connectors. Transitional devices, discourse markers. | 2 | | |
| Drawing a powerful conclusion: recapping main points, concluding, home-take messages. | 2 | | |
| Inviting questions, managing rapport, expressing opinion, attitude. | 2 | | |
| Formal vs informal language – politeness in a foreign language. Using humor, irony and personal anecdote to convey subtle meanings and gain audience support. | 2 | | |
| Students' presentations | 2 | | |
| Bibliography | | | |
| <ol style="list-style-type: none"> 1. Adrian Wallwork (2010), <i>English for Presentations at International Conferences</i>, Springer. 2. Andrew Bradbury (2006) <i>Successful Presentation Skills</i>, Kogan Page, London. 3. Angela M. Thody (2006) <i>Writing and Presenting Research</i>, Sage Publications. 4. Powell, M. (1998) <i>Presenting in English</i> (2nd edition), LTP, London. | | | |

5. Grussendorf, M. (2011) *Oxford English for Presentations*, Express series. OUP.

**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 of study, making informed decisions on various types of information, and keeping up-to-date with state of the art knowledge in students' professional field.

10. Evaluation

| Activity type | Assessment criteria | Assessment methods | Weight in the final grade |
|---|--|---|---|
| Course | | | |
| Seminar | Completion of tasks in class activities, homework or individual study solving, attendance to seminars, delivering own presentation | On-going class-work evaluation; Rubric-based evaluation of students' presentation | Class-work evaluation – 30% Own presentation 70% |
| Laboratory | | | |
| Project | | | |
| Minimum standard of performance: at least 50% of all components of tasks solved correctly | | | |

Teachers in charge of applications

Conf.dr. Sonia Munteanu

Asist.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 | 14. |

2. Data about the subject

| | | | | | |
|--|---|---------------------|---|---|----|
| 2.1 Subject name | | Sport I | | | |
| 2.2 Course responsible/lecturer | | | | | |
| 2.3 Teachers in charge of seminars/ laboratory/ project | | As.dr. Adrian Suciu | | | |
| 2.4 Year of study | I | 2.5 Semester | 2 | 2.6 Type of assessment (E - exam, C - colloquium, V - verification) | V |
| 2.7 Subject category | <i>DF – fundamentală, DD – în domeniu, DS – de specialitate, DC – complementară</i> | | | | DC |
| | <i>DI – Impusă, DOp – opțională, DFac – facultativă</i> | | | | DI |

3. Estimated total time

| | | | | | | | | | | |
|--|----|-----------|--------|--|----------|----|------------|--|---------|----|
| 3.1 Number of hours per week | 2 | of which: | Course | | Seminars | 2 | Laboratory | | Project | |
| 3.2 Number of hours per semester | 28 | of which: | Course | | Seminars | 28 | Laboratory | | Project | |
| 3.3 Individual study: | | | | | | | | | | |
| (a) Manual, lecture material and notes, bibliography | | | | | | | | | | - |
| (b) Supplementary study in the library, online and in the field | | | | | | | | | | 20 |
| (c) Preparation for seminars/laboratory works, homework, reports, portfolios, essays | | | | | | | | | | - |
| (d) Tutoring | | | | | | | | | | - |
| (e) Exams and tests | | | | | | | | | | 2 |
| (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 | |
| 4.8 Competence | physically fit, necessary skills, knowledge, skills and abilities gained in classes I-XII |

5. Requirements (where appropriate)

| | |
|---------------------------|--|
| 5.1. For the course | Muncii Blvd, no.103-105, Cluj-Napoca, Politehnica Swimming Complex |
| 5.2. For the applications | Sports Hall, Muncii Blvd, no.103-105, Cluj-Napoca Outdoor and Fitness - Complex Polytechnic |

6. Specific competence

| | |
|------------------------------|---|
| 6.1 Professional competences | N/A |
| 6.2 Cross competences | CT2 – Identifying, describing and conducting processes in the projects management field, assuming different roles inside the team and clearly and concisely describing, verbally or in writing, in Romanian and in an international language, the own results from the activity field. |

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

| | |
|-------------------------|--|
| 7.1 General objective | <ul style="list-style-type: none">• Harmonious physical development• Maintain health at a high standard |
| 7.2 Specific objectives | <ul style="list-style-type: none">• Capacity development effort• Learning and motor skills development• Education volitional qualities |

8. Contents

| 8.1 Lectures | Hours | Teaching methods | Notes |
|---|-------|------------------|-------|
| - | | | |
| Bibliography | | | |
| - | | | |
| 8.2 Applications – Seminars/Laboratory/Project | Hours | Teaching methods | Notes |
| Discipline demands and promotion criterion | 4 | interactive | |
| Testing of movement skills, capacities and knowledge accumulated in secondary and high school | 4 | | |
| Adaptation with physical effort | 4 | | |
| Learning of technical process (methods) accessible and possible | 4 | | |
| Repetition (improving) of technical process (methods). | 4 | | |
| Learning new technical process (methods) | 4 | | |
| Semestrial verification | 4 | | |
| Bibliography | | | |
| 1. Curs de Educație fizică – Litografiat UTC-N | | | |
| 2. Dezvoltare fizică generală pentru studenți – UTC-N | | | |
| 3. Cultură fizică pentru tineret - UTPRES | | | |

**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

Sports activity there in the curriculum of universities and faculties in the country and abroad. Content is consistent with the expectations of professional associates and employers epistemic community representative of the afferent program.

10. Evaluation

| Activity type | Assessment criteria | Assessment methods | Weight in the final grade |
|--|--|----------------------------|---------------------------|
| Course | | | |
| Seminar | 70% + 30% Frequency Active Participation, sports skills and advances | By passing control samples | 100% |
| Laboratory | | | |
| Project | | | |
| Minimum standard of performance: Fulfilling the criteria of evaluation with emphasis on active participation in class, advancements, sports skills. | | | |

Course responsible
As.dr. Adrian Suciu

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 | 100. |

2. Data about the subject

| | | | | | |
|--|---|--------------|---|---|------|
| 2.1 Subject name | <i>Psihologia Educației</i> | | | | |
| 2.2 Course responsible/lecturer | Lect. dr. Trif Gheorghe Florin | | | | |
| 2.3 Teachers in charge of seminars/ laboratory/ project | Lect. dr. Trif Gheorghe Florin | | | | |
| 2.4 Year of study | I | 2.5 Semester | 2 | 2.6 Type of assessment (E - exam, C - colloquium, V - verification) | E |
| 2.7 Subject category | <i>DF – fundamentală, DD – în domeniu, DS – de specialitate, DC – complementară</i> | | | | DC |
| | <i>DI – Impusă, DOp – opțională, DFac – facultativă</i> | | | | 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 | | | | | | | | | | 40 |
| (b) Supplementary study in the library, online and in the field | | | | | | | | | | 15 |
| (c) Preparation for seminars/laboratory works, homework, reports, portfolios, essays | | | | | | | | | | 15 |
| (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 | - |
| 4.9 Competence | - |

5. Requirements (where appropriate)

| | |
|---------------------------|---|
| 5.1. For the course | Sala de curs, videoproiector, tabla, flip-chart |
| 5.2. For the applications | - |

6. Specific competence

| | |
|------------------------------|---|
| 6.1 Professional competences | <p>Cunoștințe teoretice, (Ce trebuie sa cunoască)</p> <ul style="list-style-type: none"> - Stăpânirea conceptelor, teoriilor, metodelor și principiilor psihologiei educației - Înțelegerea esenței și a particularităților procesului de învățare - Cunoașterea și înțelegerea metodelor și tehnicilor evaluare a personalității elevului - Stăpânirea conceptelor, respectiv a metodologiei aferente dezvoltării individului ; - Înțelegerea și utilizarea corectă a noțiunilor și principiilor privind procesele |
|------------------------------|---|

| | |
|-----------------------|---|
| | <p>cognitive și metacognitive implicate în procesul de învățare.</p> <p>Deprinderi dobândite: (Ce știe să facă)</p> <p>Aplicarea principiilor și metodelor didactice specifice activităților / disciplinelor predate care să asigure progresul școlar al elevilor:</p> <ul style="list-style-type: none"> - Evaluarea psihocomportamentală a elevului utilizând fișa de observație a comportamentului; - Aplicarea principiilor învățării pentru proiectarea de activități didactice eficiente; - Utilizarea de tehnici de modificarea comportamentului elevului; - Aplicarea unor strategii cognitive și metacognitive pentru eficientizarea învățării. <p>Abilități dobândite: (Ce instrumente știe să mănuiască)</p> <ul style="list-style-type: none"> - Utilizarea eficientă a instrumentelor multimedia și a facilităților internet în proiectarea și derularea activităților didactice. |
| 6.2 Cross competences | <ul style="list-style-type: none"> - Realizarea eficientă a activităților și exercitarea rolurilor specifice muncii în echipă. - Promovarea spiritului de inițiativă, dialogului, cooperării, atitudinii pozitive și respectului față de ceilalți, diversității și multiculturalității și îmbunătățirea continuă a propriei activități. - Utilizarea eficientă a abilităților lingvistice și a cunoștințelor de tehnologia informației și a comunicării. |

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

| | |
|-------------------------|---|
| 7.1 General objective | Dobândirea fundamentelor teoretice privind dinamica și evoluția psihocomportamentală a elevilor; valorificarea cunoștințelor acumulate în elaborarea unor produse (fișa de observație, instrumente de modificare comportamentului, formularea de obiective educaționale în concordanță cu modalități de învățare eficientă), de natură să indice capacități de analiză, sinteză, aplicare, interpretare și gândire critică ale studenților. |
| 7.2 Specific objectives | <ol style="list-style-type: none"> 1. formarea capacității de analiză și evaluare a procesului de învățare; 2. formarea capacității de a cunoaște profilul psihocomportamental al elevului; 3. formarea abilității de a adecva conținuturile educaționale la particularitățile de vârstă a elevilor 4. utilizarea unor tehnici de modificare a comportamentului elevului care conduc la menținerea disciplinei. |

8. Contents

| 8.1 Lectures | Hours | Teaching methods | Notes |
|---|-------|--|-------|
| Introducere în psihologia educationala | 2 | Curs interactiv: - expunerea; - prelegerea intensificată; - explicația; - conversația euristică; | |
| Aspecte motivationale ale strategiilor de învățare. Valori, scopuri si planificare. | 2 | | |
| Informatia si cunoasterea psihologica. Perspectiva teoriei procesării informației asupra învățării în școală. | 2 | | |
| Paradigma constructivistă privind învățarea în școală | 2 | | |
| Instrumente pentru îmbunătățirea procesului de învățare : hărți conceptuale, tehnici de memorare | 2 | | |
| Învatarea analiză critică a modelelor teoretice prezentate anterior. | 2 | | |
| Creativitatea si relevanta ei în învățarea scolara. | 2 | | |
| Modificari comportamentale aplicate în scoala. | 2 | | |
| Perceptia persoanei în contextul clasei de elevi. Instrumente pentru diagnosticarea stilurilor de învățare. | 2 | | |
| Dezvoltarea copilului și adolescentului. | 2 | | |
| Dezvoltarea personalității morale. Cunoașterea personalității elevilor. Metacogniția, modalități de dezvoltare a abilităților metacognitive | 2 | | |
| Metacogniția, modalități de dezvoltare a abilităților metacognitive. | 2 | | |

| | | | |
|---|-------|---|-------|
| Cercetarea psihopedagogica si elaborarea lucrarilor stiintifice. | 2 | | |
| Instruirea asistată de calculator | 2 | | |
| Bibliography | | | |
| Ausubel, D., Robinson, F., (1981). <i>Învățarea în școală. O introducere în psihologia pedagogică</i> , EDP, Buc., | | | |
| Hilgrad, E. R., Bower, G.H., (1974). <i>Teorii ale învățării</i> , EDP, Buc., | | | |
| Andrew J. Elliot (1999) Approach and avoidance motivation and achievement goals, <i>Educational Psychologist</i> , 34:3, 169-189 | | | |
| Jurcău, N. (coord) (2008). <i>Psihologia educației</i> , Cluj-Napoca: Editura U. T. Pres. | | | |
| Miclea, Mircea. (1994). <i>Psihologie cognitivă</i> , Cluj-Napoca: Casa de Editură Gloria SRL. | | | |
| Radu, I. , (coord.). (1991). <i>Introducere în psihologia contemporană</i> , Cluj-Napoca: Editura Sincron. | | | |
| Neculau, A. (1998). <i>Psihologie socială</i> , Iași, Ed. polirom. | | | |
| Jonathan A. Plucker , Ronald A. Beghetto & Gayle T. Dow (2004) Why Isn't Creativity More Important to Educational Psychologists? Potentials, Pitfalls, and Future Directions in Creativity Research, <i>Educational Psychologist</i> 39:2,83-96 | | | |
| Sibylle Gruber & Jean Boreen (2003) Teaching Critical Thinking: Using experience to promote learning in middle school and college students, <i>Teachers and Teaching: theory and practice</i> , 9:1, 5-19 | | | |
| Joke H. van Velzen (2012) Teaching metacognitive knowledge and developing expertise, <i>Teachers and Teaching: theory and practice</i> , 18:3, 365-380 | | | |
| Elizabeth Campbell (2004) Ethical bases of moral agency in teaching, <i>Teachers and Teaching: theory and practice</i> , 10:4, 409-428 | | | |
| Trif, G. F. (2002). Diagnosticul competențelor psihopedagogice ale cadrelor didactice formate prin programe de instruire online. <i>Analele Universității din Oradea</i> , vol.1, pag. 59-83 (ISSN: 1583-2910). | | | |
| Trif G. F., Jurcău, N., Calboreanu, A., (2002). Constructivism versus cognitiv-comportamental în dezvoltarea programelor de instruire online. <i>Analele Universității din Oradea</i> , vol.2, pag. 177-207 (ISSN: 1583-2910). | | | |
| Trif, G. F., (2005). <i>Ce metode se folosesc în cercetare psihologică?</i> , în L. Filimon coord, <i>Formare în profesia didactică</i> , Ed Univ. din Oradea. | | | |
| Trif, G. F., (2012). <i>Programe de instruire online pentru formarea cadrelor didactice</i> . Editura Accent, Cluj-Napoca. | | | |
| 8.2 Applications – Seminars/Laboratory/Project | Hours | Teaching methods | Notes |
| Psihologia educationala: principii, obiective, metode | 2 | Problematizarea; - tutorial; - exerciții; - dezbateră; - studiul de caz; - discuția referatelor; | |
| Exercitii de identificare a valorilor si de planificare pentru învățare și pentru predare. | 2 | | |
| Teoria procesării informației și învățarea în școală: simulare, dezbateră | 2 | | |
| Paradigma constructivistă pentru învățarea în școală: tutorial, studiu de caz | 2 | | |
| Modalități de aplicare ale principiilor învățării în procesul de proiectare didactică – aplicație harta conceptuală | 2 | | |
| Dezbateră privind comparațiile punctelor tari și slabe ale teoriilor | 2 | | |
| Instrumente de dezvoltare a creativității | 2 | | |
| Modificări comportamentale aplicate în școală: întărirea, modelarea, extincția- exerciții, studii de caz | 2 | | |
| Aplicarea si discutarea inventarului stilurilor de învățare Vermunt. | 2 | | |
| Stadiile dezvoltării psihologice ale copilului: discuții, cazuri | 2 | | |
| Dezvoltarea morală a elevilor : discuții ale unor dileme morale | 2 | | |
| Modalitati de cunoastere a proceselor cognitive si metacognitive ale elevilor. | 2 | | |
| Metode psihologice de investigare a elevului și a clasei: experimental, studiul corelational | 2 | | |
| Factori psihologici ai instruirii mediate de calculator. | 2 | | |
| Bibliography | | | |
| Ausubel, D., Robinson, F., (1981). <i>Învățarea în școală. O introducere în psihologia pedagogică</i> , EDP, Buc., | | | |
| Hilgrad, E. R., Bower, G.H., (1974). <i>Teorii ale învățării</i> , EDP, Buc., | | | |
| Andrew J. Elliot (1999) Approach and avoidance motivation and achievement goals, <i>Educational Psychologist</i> , 34:3, 169-189 | | | |
| Jurcău, N. (coord) (2008). <i>Psihologia educației</i> , Cluj-Napoca: Editura U. T. Pres. | | | |
| Miclea, Mircea. (1994). <i>Psihologie cognitivă</i> , Cluj-Napoca: Casa de Editură Gloria SRL. | | | |

Radu, I. , (coord.). (1991). *Introducere în psihologia contemporană*, Cluj-Napoca: Editura Sincron.

Neculau, A. (1998). *Psihologie socială*, Iași, Ed. polirom.

Jonathan A. Plucker , Ronald A. Beghetto & Gayle T. Dow (2004) Why Isn't Creativity More Important to Educational Psychologists? Potentials, Pitfalls, and Future Directions in Creativity Research, *Educational Psychologist* 39:2,83-96

Sibylle Gruber & Jean Boreen (2003) Teaching Critical Thinking: Using experience to promote learning in middle school and college students, *Teachers and Teaching: theory and practice*, 9:1, 5-19

Joke H. van Velzen (2012) Teaching metacognitive knowledge and developing expertise, *Teachers and Teaching: theory and practice*, 18:3, 365-380

Elizabeth Campbell (2004) Ethical bases of moral agency in teaching, *Teachers and Teaching: theory and practice*, 10:4, 409-428

Trif, G. F. (2002). Diagnosticul competențelor psihopedagogice ale cadrelor didactice formate prin programe de instruire online. *Analele Universității din Oradea*, vol.1, pag. 59-83 (ISSN: 1583-2910).

Trif G. F., Jurcău, N., Calboreanu, A., (2002). Constructivism versus cognitiv-comportamental în dezvoltarea programelor de instruire online. *Analele Universității din Oradea*, vol.2, pag. 177-207 (ISSN: 1583-2910).

Trif, G. F., (2005). *Ce metode se folosesc în cercetare psihologică?*, în L. Filimon coord, *Formare în profesia didactică*, Ed Univ. din Oradea.

Trif, G. F., (2012). *Programe de instruire online pentru formarea cadrelor didactice*. Editura Accent, Cluj-Napoca.

*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

Competențele dobândite la absolvirea acestui curs permit absolventului, indiferent de specializare, o gestionare mai eficientă a vieții personale și profesionale, respectiv o inserție productivă pe piața forței de muncă (prin cunoștințele și competențele privind: managementul stresului, al timpului, cunoașterea posibilităților personale și profesionale reale, autodepășire și motivare, aplicarea pentru job-ul adecvat, comunicare eficientă ș.a.).

10. Evaluation

| Activity type | Assessment criteria | Assessment methods | Weight in the final grade |
|---|--|--------------------------------------|---------------------------|
| Course | Rezolvarea de probleme si raspunsuri pentru subiecte din teorie | Proba scrisa: durata evaluarii 2 ore | 60% |
| Seminar | Aprecierea rezultatelor activității din timpul orelor de seminar | | 40% |
| Laboratory | | | |
| Project | | | |
| Minimum standard of performance: Să rezolve subiecte corespunzând notei minime 5. | | | |

Course responsible
Lect. dr. Trif Gheorghe Florin

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 | 101. |

2. Data about the subject

| | | | | | |
|--|---|--------------|---|---|------|
| 2.1 Subject name | Fundamentals of Electronic Circuits | | | | |
| 2.2 Course responsible/lecturer | Prof. Gabriel OLTEAN, PhD | | | | |
| 2.3 Teachers in charge of seminars/ laboratory/ project | Prof. Gabriel OLTEAN, PhD | | | | |
| 2.4 Year of study | I | 2.5 Semester | 2 | 2.6 Type of assessment (E - exam, C - colloquium, V - verification) | C |
| 2.7 Subject category | <i>DF – fundamentală, DD – în domeniu, DS – de specialitate, DC – complementară</i> | | | | DD |
| | <i>DI – Impusă, DOp – opțională, DFac – facultativă</i> | | | | DFac |

3. Estimated total time

| | | | | | | | | | | |
|--|----|-----------|--------|----|----------|--|------------|-----|---------|----|
| 3.1 Number of hours per week | 4 | of which: | Course | 2 | Seminars | | Laboratory | 1 | Project | 1 |
| 3.2 Number of hours per semester | 56 | of which: | Course | 28 | Seminars | | Laboratory | 14 | Project | 14 |
| 3.3 Individual study: | | | | | | | | | | |
| (a) Manual, lecture material and notes, bibliography | | | | | | | | | | 28 |
| (b) Supplementary study in the library, online and in the field | | | | | | | | | | 12 |
| (c) Preparation for seminars/laboratory works, homework, reports, portfolios, essays | | | | | | | | | | 28 |
| (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))) | | | | | | | | 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 | |
| 4.10 Competence | Basic knowledge about electrical signals, electric circuits, passive electronic components |

5. Requirements (where appropriate)

| | |
|---------------------------|-----|
| 5.1. For the course | N/A |
| 5.2. For the applications | N/A |

6. Specific competence

| | |
|------------------------------|---|
| 6.1 Professional competences | <p>C1 - Operating with basic concepts of mathematics, physics, measurement science, mechanical engineering, chemical engineering, electrical engineering in systems engineering</p> <p>C1.1 - Using the concepts, theories and methods of the fundamental sciences of systems engineering in professional communication</p> <p>C1.2 - Explaining the problems to be solved and the argumentation of the solutions in system engineering using the techniques, concepts, and methods of</p> |
|------------------------------|---|

| | |
|-----------------------|---|
| | <p>mathematics, physics, technical graphics, electrical engineering and electronics.</p> <p>C1.3 - Solving common problems of systems engineering by identifying the appropriate techniques, principles, methods and application of mathematics, with emphasis on numerical methods.</p> <p>C1.4 - Assessing the potential, advantages and disadvantages of the methods and procedures of the systems engineering field, the scientific documentation level and the consistency of project applications using mathematical techniques and other scientific methods.</p> <p>C1.5 - Development of projects in the field of systems engineering by selecting and applying mathematical and other scientific methods specific to the field.</p> |
| 6.2 Cross competences | N/A |

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

| | |
|-------------------------|--|
| 7.1 General objective | Developing the competences regarding the use of electronic devices, analysis and (re)design of fundamental electronic circuits. |
| 7.2 Specific objectives | <ol style="list-style-type: none"> 1. Recognizing and understanding basic concepts specific to electronic devices and fundamental electronic circuits. 2. Developing skills and abilities necessary for the use of electronic devices in simple electronic circuits 3. Developing skills and abilities necessary for the use of electronic circuits 4. Developing skills and abilities for the analysis and (re)design of basic electronic circuits. |

8. Contents

| 8.1 Lectures | Hours | Teaching methods | Notes |
|---|-------|--|--|
| Introduction. Fundamentals: electrical signals, relations and theorems for electric circuits. | 2 | Presentation, heuristic conversation, exemplification, problem presentation, teaching exercise, case study, formative evaluation | Use of ppt presentation, projector, blackboard |
| Diodes. Models for diode. DR circuits. DC circuits. Single-phase rectifiers with capacitive filter. Zener Diode. LED | 2 | | |
| Operational amplifier (op amp). Op-amp terminals. Op-amp operation. Ideal op amp. Modes of use. | 2 | | |
| Simple op-amp comparators. Inverting and noninverting comparators. Voltage transfer characteristic. Waveforms | 2 | | |
| Positive feedback op-amp comparators. Inverting and noninverting comparators. Voltage transfer characteristic. Waveforms | 2 | | |
| Negative feedback op-amp amplifiers. Inverting, noninverting amplifiers: voltage transfer characteristic, waveforms, gain, input and output resistances. | 2 | | |
| Op-amp applications: summing amplifiers, differential amplifiers, voltage domain conversion circuits, integrator and differentiator; precision rectifier. | 2 | | |
| Transistor digital circuits. MOSFET Digital Circuits. Bipolar digital circuits. Noise margins. | 2 | | |
| DC voltage regulators. Parametric regulators. Linear voltage regulators with op amp. Increasing the output current. Over - current and short - circuit protection. | 2 | | |
| Integrated voltage regulators. The 723 voltage regulator. Three – terminal fixed regulator. Switching voltage regulators. | 2 | | |
| Sinusoidal oscillators. Oscillation criterion. RC oscillators. Op – amp and Wien bridge oscillators. Automatic control of the amplitude. Op amp and RC ladder network oscillator. | 2 | | |
| Nonsinusoidal oscillators. Astable multivibrators. Astable multivibrator with one op – amp. Astable multivibrator with an integrator and a comparator. Quartz – crystal clock generator. LM555 timer. | 2 | | |
| Power amplifiers. Amplifier classes. Class B amplifiers. Operating | 2 | | |

| | | | |
|--|-------|---|---|
| principle, VTC, crossover distortions, waveforms, powers, efficiency. | | | |
| Class AB amplifiers. Biasing using diodes. Biasing using V_{BE} multiplier. Overcurrent protection. Use of compound transistors with higher current gain. | 2 | | |
| Bibliography 1. Oltean, G., Electronic Devices, Editura U.T. Pres, Cluj-Napoca, ISBN 973-662-220-7, 2006; 317 pag. 2. Oltean, G., Circuite electronice, UT Pres, Cluj-Napoca, 2007, ISBN 978-973-662-300-4, 203 pag. 3. Sedra, A. S., Smith, K. C., Microelectronic Circuits, Fifth Edition, Oxford University Press, ISBN: 0-19-514252-7, 2004. On-line resources: Oltean, G. Fundamentals of Electronic Circuits (course slides, exam subjects) http://www.bel.utcluj.ro/dce/didactic/fec_aai/fec_aai.htm | | | |
| 8.2 Applications – Seminars/Laboratory/Project | Hours | Teaching methods | Notes |
| Seminars | | Didactic and experimental proof, didactic exercise, team work | Use of laboratory instruments, experimental boards, computers, magnetic board, blackboard |
| Fundamentals | 1 | | |
| Diodes | 1 | | |
| Op-amp comparators | 1 | | |
| Op-amp amplifiers. Logic Circuits with Transistors | 1 | | |
| Voltage Regulators. Integrated Voltage Regulators | 1 | | |
| Sinusoidal Oscillators. Nonsinusoidal oscillators | 1 | | |
| Power Amplifiers. Review | 1 | | |
| Laboratory | | | |
| Lab instrumentation | 1 | | |
| Applications of DR circuits | 1 | | |
| Op-Amp voltage comparator | 1 | | |
| Op-Amp basic amplifier | 1 | | |
| LM 7805 voltage regulator | 1 | | |
| Class B amplifier | 1 | | |
| Laboratory test | 1 | | |
| Bibliography 1. Oltean, G., Sipos, Emilia, Miron, C., Ivanciu, Laura, Laboratory Manual for Electronic Devices, Editura UTPRESS, Cluj Napoca, 2010, ISBN 978-973-662-542-8, 90 pag. 2. Şipoş, Emilia, Oltean, G., Miron, C., Ivanciu, Laura, Gordan, Mihaela, Fundamental Electronic Circuits. Laboratory Manual, UT Pres, Cluj-Napoca, 2009, ISBN 978-973-662-503-9; 91 pag On – line references 1. Oltean, G., Fundamentals of Electronic Circuits, PowerPoint slides, http://www.bel.utcluj.ro/dce/didactic/fec_aai/fec_aai.htm 2. Oltean, G, et al., Fundamentals of Electronic Circuits. Seminars and laboratories, http://www.bel.utcluj.ro/dce/didactic/fec_aai/fec_aai.htm | | | |

*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 discipline content and the acquired skills are in agreement with the expectations of the professional organizations and the employers in the field, where the students carry out the internship stages and/or occupy a job, and the expectations of the Romanian Agency for Quality Assurance (ARACIS).

10. Evaluation

| Activity type | Assessment criteria | Assessment methods | Weight in the final grade |
|---------------|---|---|---------------------------|
| Course | The level of theoretical knowledge and practical skills acquired for the analysis and (re)design of electronic circuits | - 3 formative evaluation tests (problem solving) | - T, max 10 pts. 10% |
| | | - Summative evaluation written exam (theory and problems) | - E, max 10 pts. 60% |

| | | | |
|--|--|-----------------------------------|--------------------------|
| Seminar | The level of the abilities acquired for problem solving and experimental analysis of electronic circuits | - Continuous formative evaluation | - S, max. 10 pts. 10% |
| Laboratory | | | - L, max. 10 pts. 20% |
| Project | | | |
| Minimum standard of performance: $L \geq 5, E \geq 4$ $0.6E+0.1T+0.2L+0.1S \geq 4.5$ | | | |

Course responsible
Prof. Gabriel OLTEAN, PhD

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 | 102. |

2. Data about the subject

| | | | | | |
|--|---|--------------|---|---|------|
| 2.1 Subject name | Chemistry | | | | |
| 2.2 Course responsible/lecturer | Assoc. prof. chem. Mihaela-Ligia Unguresan; Mihaela.Unguresan@chem.utcluj.ro | | | | |
| 2.3 Teachers in charge of seminars/ laboratory/ project | Assoc. prof. chem. Mihaela-Ligia Unguresan; Mihaela.Unguresan@chem.utcluj.ro | | | | |
| 2.4 Year of study | I | 2.5 Semester | 2 | 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 | | | | DFac |

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 | | | | | | | | | | 10 |
| (c) Preparation for seminars/laboratory works, homework, reports, portfolios, essays | | | | | | | | | | 10 |
| (d) Tutoring | | | | | | | | | | 5 |
| (e) Exams and tests | | | | | | | | | | 4 |
| (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 | General knowledge of chemistry in high school |
| 4.1.1 Competence | Arithmetics, Algebra, Mathematical analysis; Physics. |

5. Requirements (where appropriate)

| | |
|---------------------------|---|
| 5.1. For the course | N/A |
| 5.2. For the applications | Attendance at scheduled laboratory classes is compulsory. |

6. Specific competence

| | |
|------------------------------|---|
| 6.1 Professional competences | <p>C1 – Operating with basic Mathematical, Engineering and Computer Science concepts</p> <p>C1.1 – Recognizing and describing concepts that are specific to the fields of calculability, complexity, programming paradigms, and modeling computational and communication systems</p> <p>C1.3 – Building models for various components of computing systems</p> <p>C1.5 – Providing a theoretical background for the characteristics of the designed</p> |
|------------------------------|---|

| | |
|-----------------------|---------|
| | systems |
| 6.2 Cross competences | N/A |

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

| | |
|-------------------------|---|
| 7.1 General objective | <p>Throughout the semester, this course will touch on many different aspects in the field of chemistry. Each one of you should gain knowledge in the field and better appreciate the connection between chemistry and everyday life and more specifically how chemistry is relevant to biological processes and the health industry. Upon successful completion of this course, students will be able:</p> <ul style="list-style-type: none"> - to classify basic forms of matter; - to perform mathematical unit conversions; - to describe atomic structure and how it affects the structure of the Periodic Table of Elements, apply basic concepts of chemical bonding and predict simple molecular formulas, and write and analyze chemical formulas; - to know the interest materials in the electro techniques, electronics, communications, automation and computers: metals and alloys, plastics and semiconductors; - to monitor the automated methods for the implementation of fixing the coefficients of chemical reactions; - to predict, depict and describe: gas behavior, basic properties of chemical bonding, molecular geometry and theory of bonding, liquids and intermolecular forces; - to deepen the phenomena of electrolysis, electroplating, cathodic deposition, the phenomena of corrosion and corrosion protection. |
| 7.2 Specific objectives | <ul style="list-style-type: none"> - To know how to use the apparatus and glassware from the chemistry laboratory, how to measure temperature, pressure, concentration, titre or the purity of some substances or solutions; how to analyze the experimental chemical data obtained. - To follow the application of the methods for the establishment of the coefficients of chemical reactions. Understand and apply concepts to solve problems using: matter and measurement, atoms, molecules and ions, stoichiometry & calculations/chemical formulas equations - To know how to measure the electrode potential, the pH of a solution of metal. After reading discipline students will be able to: - analyze the chemical substances in a qualitatively and quantitatively mode; - know how to interpret graphical results obtained as a result of the kinetic study of chemical reactions, of the thermodynamics of a chemical process. |

8. Contents

| 8.1 Lectures | Hours | Teaching methods | Notes |
|--|-------|---------------------|-------|
| Fundamental concepts in chemistry.(general presentation; chemistry classification; the distribution of elements in nature, chemical compound, substance quantity) | 2 | Lecture by teacher; | |
| The periodical system of elements (atom components; radioactivity; periodic system structure; physical and chemical properties) | 2 | | |
| Chemical bonds (ionic bond, covalent polar and nonpolar bond; metallic bond; Van der Waals, dipole-dipole, ion-dipole, hydrogen bonds) | 2 | | |
| The gas state (law gases; real gases; virial coefficients; Van der Waals equation) | 2 | | |
| Liquid state. Solid state. (viscosity coefficient; vapor pressure; surface tension; crystalline substances, amorphous solid; crystalline systems; state transformations) | 2 | | |
| Metals (nonferrous, fusible; precious metals; superconductivity) Ceramic materials (history; ferromagnetic, ferroelectrics, piezoelectric materials; refractors; radio ceramics) | 2 | | |

| | | | |
|--|-------|--|--|
| Semiconductors (quantum mechanics, orbital functions; Schrödinger equation; bands formation; semiconductor combinations; impurification; Schottky and Frenkel defects; integrate circuits) | 2 | Class discussion conducted by teacher; Ppt. Presentation; Tutorials; Coaching: special assistance provided for students having difficulty in the course. | |
| Chemical processes. Separation techniques (filtration, precipitation, simple and fractional distillation, crystallization, adsorption, extraction, flotation, osmosis, chromatography, electrophoresis, neutralization, oxidation, reduction, coagulation, condensation etc) | 2 | | |
| Thermodynamics concepts (thermodynamic system state; state variables; thermodynamic equilibrium; first and second laws of thermodynamics and their consequences) | 2 | | |
| Thermochemistry (calorimetry; Lavoisier-Laplace's law, Hess's law; applications) | 2 | | |
| Chemical equilibrium (masses action law; chemical equilibrium in homogeneous systems; relations between K_p , K_c and K_x ; heterogeneous chemical equilibrium; dimensions characteristic to chemical equilibrium; applications) | 2 | | |
| The kinetics of chemical reactions (reaction rate; order rate (0, 1, 2, 3, fractional); reaction mechanism; kinetic simple reaction and complex (successive, parallel, opposite, with preequilibrium); reaction in chain; explosions) | 2 | | |
| Electrochemistry (electrolytic dissociation; electrodes; potentials of electrodes; electrolysis; Butler-Volmer equation; galvanic cells; accumulators) | 2 | | |
| Metal corrosion. Anticorrosion protection General terms: influencing factors in the process of corrosion; monitoring methods based on thermodynamic stability of the metal; corrosion protection methods. | 2 | | |
| Bibliography | | | |
| 1. M.-L. Ungureşan, D. M. Gligor, <i>General Chemistry</i> , Ed. UTPRESS, Cluj-Napoca, 2012, pg. 490. | | | |
| 2. M.-L. Ungureşan, L. Jantschi, <i>Thermodynamics and Chemical Kinetics</i> , Ed. Mediamira, Cluj-Napoca, 2005. | | | |
| 3. L. Jantschi, M.-L. Ungureşan, <i>Special Chapters of Chemistry for Automatics</i> , Ed. UTPRESS, Cluj-Napoca, 2002. | | | |
| 4. T. Coloşi, M. Abrudean, M.-L. Ungureşan, V. Mureşan, <i>Numerical Simulation Method for Distributed Parameters Processes using the Matrix with Partial Derivatives of the State Vector</i> , Ed. Springer, 2013, pg. 343. | | | |
| 8.2 Applications – Seminars/Laboratory/Project | Hours | Teaching methods | Notes |
| Presentation of work. Safety norms. Analytical balance. Chemical laboratory utensils, glassware and laboratory equipment | 2 | Using and organising techniques, apparatus and materials; Observing, measuring and recording; Handling experimental observations and data; Planning and evaluating investigations. | Mathematical modeling and numerical simulations, experimental apparatus. |
| Acid-base titration. Determination by titration of acetic acid content of vinegar | 2 | | |
| Determination of molar mass of carbon dioxide | 2 | | |
| Hydrated Ionic Compound | 2 | | |
| Caffeine isolation | 2 | | |
| Hydrolyze | 2 | | |
| Determination of enthalpy, entropy and free enthalpy at different temperatures | 2 | | |
| The heat of hydration of copper(II) sulphate | 2 | | |
| Thermal analysis | 2 | | |
| Acidity of solutions. Conductivity measurements. | 2 | | |
| Reaction rate. The kinetic of simple and complex reactions. | 2 | | |
| Activity series of the metals. | 2 | | |
| Cu spontaneous deposition. Protection of metals against corrosion. | 2 | | |
| Metal corrosion. | 2 | | |
| Bibliography | | | |
| 1. M.-L. Ungureşan, L. Jantschi, D. Gligor, <i>Educational Applications of Chemistry on the Computer</i> , Ed. Mediamira, Cluj-Napoca, 2004. | | | |
| 2. A. Mesaroş, L. Bolunduţ, M.-L. Ungureşan, <i>General Chemistry Experiments</i> , Ed. Galaxia Gutenberg, Colectia Tehne 5, ISBN: 978-973-141-228-3, 2010, pg. 197. | | | |

3. L. Bolunduț, A. Mesaroș, M.-L. Ungureșan, *Electrochemistry Experiments*, Ed. Galaxia Gutenberg, Colecția Tehne 1, 2009, pg. 110.

4. M.-L. Ungureșan, E. M. Pică, H. Nașcu, L. Marta, *Chemistry exercises*, Ed. Mediamira, Cluj-Napoca, 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

Collaborations with: INCDTIM Cluj, Faculty of Chemistry and Chemical Engineering, UBB Cluj, Faculty of Environmental Science and Engineering UBB.

10. Evaluation

| Activity type | Assessment criteria | Assessment methods | Weight in the final grade |
|---|---------------------|----------------------------|---------------------------|
| Course | Written Examination | Multiple choice evaluation | 80% |
| Seminar | | | |
| Laboratory | Laboratory test | The written test | 20% |
| Project | | | |
| Minimum standard of performance: | | | |
| <ul style="list-style-type: none">Exam grade ≥ 5Laboratory grade ≥ 5 | | | |

Course responsible

Assoc. prof. chem. Mihaela-Ligia Unguresan

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 | 103. |

2. Data about the subject

| | | | | | |
|--|---|--------------|---|---|------|
| 2.1 Subject name | Pedagogie I: Fundamentele pedagogiei. Teoria și metodologia curriculumului | | | | |
| 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 | I | 2.5 Semester | 2 | 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 | <ul style="list-style-type: none"> • Psihologia educației |
| 4.1.2 Competence | <ul style="list-style-type: none"> • Competențe formate ca urmare a studierii disciplinei Psihologia educației |

5. Requirements (where appropriate)

| | |
|---------------------------|---|
| 5.1. For the course | <ul style="list-style-type: none"> • Participare activă |
| 5.2. For the applications | <ul style="list-style-type: none"> • Lectura bibliografiei recomandate • Documentare suplimentară • Elaborarea și susținerea prezentărilor planificate • Participare activă |

6. Specific competence

| | |
|------------------------------|--|
| 6.1 Professional competences | <p>C1: Proiectarea unor programe de instruire sau educaționale adaptate pentru diverse niveluri de vârstă/pregătire și diverse grupuri țintă;</p> <p>C2: Realizarea activităților specifice procesului instructiv-educativ din învățământul gimnazial;</p> |
|------------------------------|--|

| | |
|-----------------------|--|
| | <p>C6:Autoevaluarea și ameliorarea continuă a practicilor profesionale și a evoluției în carieră;</p> <p>C7:Utilizarea metodelor de cercetare științifică și prelucrare a datelor în domeniul educației;</p> <p>C8:Aplicarea caracteristicilor învățământului centrat pe elev în proiectarea, implementarea și evaluarea curriculum-ului școlar;</p> |
| 6.2 Cross competences | <p>CT1 Aplicarea principiilor și a normelor de deontologie profesională, fundamentate pe opțiuni valorice explicite, specifice specialistului în științele educației</p> <p>CT2 Cooperarea eficientă în echipe de lucru profesionale, interdisciplinare, specifice desfășurării proiectelor și programelor din domeniul științelor educației</p> <p>CT3 Utilizarea metodelor și tehnicilor eficiente de învățare pe tot parcursul vieții, în vederea formării și dezvoltării profesionale continue</p> <p>CT4: Promovarea valorilor asociate realizării unui învățământ de calitate, în conformitate cu politicile educaționale interne și în acord cu cele elaborate și popularizate la nivel european, pe baza cunoașterii specificității domeniului educațional european și a interculturalității</p> |

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

| | |
|-------------------------|---|
| 7.1 General objective | <ul style="list-style-type: none"> formarea competențelor vizând cunoașterea, interpretarea, prelucrarea și aplicarea problematicii specifice educației și pedagogiei contemporane și teoriei și metodologiei curriculum-ului în cadrul demersurilor didactice de desfășurare a activităților instructiv-educative; |
| 7.2 Specific objectives | <ul style="list-style-type: none"> identificarea corectă a referințelor empirice ale conceptelor pedagogice și semnificațiilor conceptuale ale fenomenelor educaționale; cunoașterea semnificației principalelor concepte din cadrul teoriei curriculum-ului; dezvoltarea capacităților de utilizare a conceptelor pentru analiza critică a proceselor și produselor curriculare; analizarea tendințelor de dezvoltare a pedagogiei contemporane, în contextul reformei învățământului și educației din țara noastră ; analizarea tendințelor educației în societatea cunoașterii din secolul XXI; conturarea unei imagini globale și relevante asupra problematicii educației și pedagogiei contemporane; propunerea unor modalități de articulare și integrare a tipurilor și formelor existente de educație; analizarea conceptului de educație permanentă și a sistemului instituțional întemeiat pe acest principiu; definirea și operaționalizarea adecvată a obiectivelor educaționale; aplicarea pe situații concrete a criteriilor de selecție și organizare a conținuturilor educației; operarea cu concepte, structuri și tipologii curriculare în analiza Curriculum-ului școlar (național) și identificarea principiilor care au stat la baza acestuia; propunerea unor modalități și cerințe privind elaborarea curriculum-ului la decizia școlii; dezvoltarea capacităților de analiză, proiectare, implementare și evaluare a curriculum-ului la nivelul activităților didactice; dezvoltarea motivației pozitive și a unei atitudini favorabile față de profesia didactică, a receptivității și responsabilității față de schimbările inovatoare din domeniul curriculum-ului; formarea unei atitudini epistemice deschise și inovatoare în domeniul educațional; |

8. Contents

| 8.1 Lectures | Hours | Teaching methods | Notes |
|---|-------|---|-------|
| DEZIDERATE ȘI PERSPECTIVE ALE EDUCAȚIEI ȘI ÎNVĂȚĂMÂNTULUI ÎN SECOLUL XXI. POLITICI ȘI PRACTICI EDUCAȚIONALE ÎN CONTEXTUL REFORMEI SISTEMULUI DE ÎNVĂȚĂMÂNT ROMÂNESC Priorități ale politicilor educaționale din România Direcții ale reformei sistemului de învățământ din România Deziderate și perspective ale educației de bază în politicile educaționale europene și mondiale Rolul învățământului obligatoriu în ansamblul sistemului național de învățământ | 2 | Prelegere, Conversație, Dezbateri, Suporturi video | |
| PEDAGOGIA – ȘTIINȚA EDUCAȚIEI Constituirea pedagogiei ca știință Caracterul științific al pedagogiei Sistemul științelor educației Caracterul interdisciplinar al pedagogiei ca știință Pedagogia tradițională – pedagogia contemporană | 2 | Prelegere, Conversație, Dezbateri, Suporturi video | |
| EDUCAȚIA – OBIECT DE STUDIU AL PEDAGOGIEI Educația – concept, sensuri Funcțiile educației Caracteristicile educației Structura acțiunii educaționale Noi dimensiuni și tendințe ale educației în secolul XXI | 2 | Prelegere, Conversație, Dezbateri, Suporturi video | |
| DIVERSIFICAREA CÂMPULUI EDUCAȚIEI Formele educației: educația formală, educația nonformală, educația informală Educația permanentă Autoeducația – calitate a omului modern | 2 | Prelegere, Conversație, Dezbateri, Suporturi video | |
| COMPONENTE ȘI MODALITĂȚI ALE EDUCAȚIEI Componentele educației complexe și armonioase a personalității (intelectuală, morală, estetică, religioasă, tehnologică, fizică); Noi domenii și modalități ale educației (interculturală, incluzivă, ecologică, nutrițională ș.a.); Informatizarea și educația la distanță. | 2 | Prelegere, Conversație, Dezbateri, Suporturi video | |
| EDUCABILITATEA. FACTORII DEZVOLTĂRII PSIHICE Conceptul de educabilitate Teorii privind educabilitatea Factorii dezvoltării psihice: ereditatea, mediul, educația Interacțiunea factorilor și rolul conducător al educației Optimismul pedagogic | 2 | Prelegere, Conversație, Dezbateri, Suporturi video | |
| FINALITĂȚILE EDUCAȚIEI Finalitățile educației: ideal, scopuri și obiective educaționale Funcțiile obiectivelor educaționale Clasificarea obiectivelor educaționale Operaționalizarea obiectivelor educaționale | 4 | Prelegere, Conversație, Dezbateri, Suporturi video | |
| CONȚINUTURILE EDUCAȚIEI ȘI ÎNVĂȚĂMÂNTULUI Conținuturile: concept, structură, tipologie Conținuturile educației și conținuturile învățământului: interacțiuni și interferențe Tradițional și modern în abordarea conținuturilor educației Elaborarea conținuturilor, surse și criterii de selecție și organizare Abordarea integrată a conținuturilor curriculare – dimensiune a politicilor educaționale contemporane Niveluri ale integrării curriculare: intradisciplinaritatea (monodisciplinaritatea); multidisciplinaritatea / pluridisciplinaritatea; interdisciplinaritatea; transdisciplinaritatea | 4 | Prelegere, Conversație, Dezbateri, Suporturi video | |

| | | | |
|--|--------------|---|--------------|
| CURRICULUM-UL – UN CONCEPT PEDAGOGIC INTEGRATOR Reforma curriculară și Curriculum Național Conceptul de curriculum; perspective și tendințe în analiza conceptuală a curriculum-ului Conceptul actual de curriculum: curriculum în sens larg și curriculum în sens restrâns Structuri și tipologii curriculare: curriculum nucleu și curriculum la decizia școlii, curriculum formal/nonformal/informal, predat/ învățat, curriculum universitar) | 4 | Prelegere, Conversație, Dezbateri, Suporturi video | |
| PRODUSELE CURRICULARE Planul de învățământ Programa școlară (fișele disciplinelor) Manualele școlare Alte suporturi curriculare (ghiduri, soft-uri educaționale, metodici, auxiliare didactice). | 2 | Prelegere, Conversație, Dezbateri, Suporturi video | |
| ELEMENTE DE METODOLOGIE A CERCETĂRII PEDAGOGICE Conceptele de metodă și metodologie a cercetării Sistemul metodelor de cercetare pedagogică Tipuri fundamentale de cercetare (fundamentală/aplicativă, constatativă/experimentală, transversală/longitudinală, cantitativă/calitativă) Managementul proiectelor de cercetare pedagogică Relația cercetare – dezvoltare în științele educației. | 2 | Prelegere, Conversație, Dezbateri, Suporturi video | |
| Bibliography | | | |
| 8.2 Applications – Seminars/Laboratory/Project | Hours | Teaching methods | Notes |
| Direcții ale reformei sistemului de învățământ din România Rolul învățământului obligatoriu în ansamblul sistemului național de învățământ | 2 | Prezentări, dezbateri, studii de caz | |
| Pedagogia tradițională – pedagogia contemporană | 2 | | |
| Caracteristicile educației Structura acțiunii educaționale | 2 | | |
| Formele educației: educația formală, educația nonformală, educația informală Educația permanentă Autoeducația – calitate a omului modern | 2 | | |
| Componentele educației complexe și armonioase a personalității (intelectuală, morală, estetică, religioasă, tehnologică, fizică); | 2 | | |
| Factorii dezvoltării psihice: ereditatea, mediul, educația Interacțiunea factorilor și rolul conducător al educației | 2 | | |
| Operaționalizarea obiectivelor educaționale – aplicații, exemple | 4 | | |
| Tradițional și modern în abordarea conținuturilor educației Niveluri ale integrării curriculare: intradisciplinaritatea (monodisciplinaritatea); multidisciplinaritatea / pluridisciplinaritatea; interdisciplinaritatea; transdisciplinaritatea. | 2 | | |
| Structuri și tipologii curriculare: curriculum nucleu și curriculum la decizia școlii, curriculum formal/nonformal/informal, predat/învățat, curriculum universitar) Elaborarea unei programe de opțional (CDS) | 4 | | |
| Analiza produselor curriculare: planul de învățământ programa școlară (fișele disciplinelor), manualele școlare, alte suporturi curriculare (ghiduri, soft-uri educaționale, metodici, auxiliare didactice). | 2 | | |
| Elemente de metodologie a cercetării pedagogice. Elaborarea schiței | 2 | | |

| | | | |
|--|---|--------------------------|--|
| unui proiect de cercetare pedagogică. | | | |
| 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

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10. Evaluation

| Activity type | Assessment criteria | Assessment methods | Weight in the final grade |
|---------------|---|--------------------|---------------------------|
| Course | Volumul și corectitudinea cunoștințelor | Evaluare orală | 40 |

| | | | |
|--|-----------------------------------|--------------------------|----|
| | Rigoarea științifică a limbajului | Evaluare orală | 10 |
| | Organizarea conținutului | Evaluare orală | 10 |
| | Originalitatea | Evaluare orală | 10 |
| Seminar | Susținerea unui referat | Fișă de evaluare seminar | 20 |
| | Participare activă la seminarii | Fișă de evaluare seminar | 10 |
| Laboratory | | | |
| Project | | | |
| Minimum standard of performance: 50% rezultat după însumarea punctajelor ponderate | | | |

Course responsible
Conf. univ. dr. Liana Tăușan

Head of department
Prof.dr.eng. Rodica Potolea