UNIVERSITY OF CRAIOVA
DEPARTMENT: AUTOMATION, ELECTRONICS AND MECHATRONICS
BACHELOR: APPLIED ELECTRONICS

1-ST YEAR

1. Mathematical analysis - D28ELAL101
2. Algebra and geometry - D28ELAL102
3. Physics - D28ELAL103
4. Computer programming - D28ELAL104
5. Physics and technology of electronic components - D28ELAL105
6. Applied informaics - D28ELAL106
7. English 1 - D28ELAL107
8. Physical Education - D28ELAL108
9. Special mathematics - D28ELAL201
10. Numerical methods - D28ELAL202
11. Bases of electrotechnics - D28ELAL203
12. Materials for electrotechnics - D28ELAL204
13. Programming languages and data structures- D28ELAL205
14. Computer-aided graphics - D28ELAL206
15. English 2 - D28ELAL207
16. Bases of mechanical engineering - D28ELAL208

2-ND YEAR

1. Electronic devices - D28ELAL301
2. Signals - D28ELAL302
3. Systems theory - D28ELAL304
4. Object-oriented programming - D28ELAL305
5. Object-oriented programming – project - D28ELAL306
6. Electronics technology - D28ELAL307
7. Analysis and synthesis of digital circuits - D28ELAL303
8. Basic electronic circuits - D28ELAL401
9. Basic electronic circuits – project - D28ELAL402
10. Electronic Circuits - Laboratory - D28ELAL403
11. Measurements in electronics - D28ELAL404
12. Transmission and coding of information - D28ELAL405
13. CAD techniques in the design of electronic circuits - D28ELAL406
14. The Basics of Accounting - D28ELAL407
15. The analysis and synthesis of analog circuits - D28ELAL408
16. Internship 1 - D28ELAL409

3-RD YEAR

1. Analog Integrated Circuits - D28ELAL501
2. Digital Integrated Circuits - D28ELAL502
3. Electronics Instrumentation for measuring - D28ELAL503
4. Numerical acquisition of experimental data - D28ELAL504
5. Numerical acquisition of experimental data – project - D28ELAL505
6. Optoelectronics - D28ELAL506
7. Decision and estimation in data processing - D28ELAL507
8. Microwaves - D28ELAL601
9. Digital Signal Processing - D28ELAL602
10. Programmable digital architectures - D28ELAL603
11. Programmable digital architectures - project assignment - D28ELAL604
12. Communication systems - D28ELAL605
13. Circuits for communications - D28ELAL606
14. Radiocommunications - D28ELAL607
15. Digital systems - proiect - D28ELAL608
16. Internship 2 - D28ELAL609

4-TH YEAR

1. Power Electronics - D28ELAL701
2. Power Electronics – project - D28ELAL702
3. Television systems - D28ELAL703
4. Mobile communications - D28ELAL704
5. Electrical and electronic actuators - D28ELAL705a
6. Antennas for Communications - D28ELAL706a
7. Television Equipment - D28ELAL801
8. Design of microelectronic structures - D28ELAL807b
9. Design of microelectronic structures - project - D28ELAL808b
10. Advanced mechatronic structures - D28ELAL802

1-ST YEAR

SUBJECT: MATHEMATICAL ANALYSIS

NUMBER OF CREDIT POINTS: 5
SEMESTER: I
COURSE TYPE: core course
COURSE OBJECTIVES: Introducing the basic notions of differential and integral calculus.
COURSE CONTENT: Introduction to differential calculus; Fundamental series; Limit approximation; Contraction principle; Numeric series; Approximate amount of a convergent series; Power series; Series of serial power developments; Limits and continuity for multivariable functions; Partial derivatives; Implicitly defined functions; Conditioned extremes; Introduction to integral calculus; The right Riemann integral; Improper integral; Integrals with parameter; Curvilinear integral, Double integral; Triple integral; Surface integral
Tutorial: Introduction to differential calculus; Fundamental series; Limit approximation; Contraction principle; Numeric series; Approximate amount of a convergent series; Power series; Series of serial power developments; Limits and continuity for multivariable functions; Partial derivatives; Implicitly defined functions; Conditioned extremes; Introduction to integral calculus; The right Riemann integral; Improper integral; Integrals with parameter; Curvilinear integral, Double integral; Triple integral; Surface integral
TEACHING LANGUAGE: Romanian
EVALUATION: written examination
BIBLIOGRAPHY:

Predoi, M. , Bălan, T. - Mathematical Analysis Vol I. Differential Calculus; Vol II.Integral Calculus, Ed.Universitaria, Craiova, 2005

Predoi, M. - Analiză matematică, Ed. Universitaria, Craiova, 1994

Predoi, M. , Constantinescu, D., Racilă, M. - Teme de calcul diferențial, Ed.Sitech, Craiova, 2003, 2005

Predoi, M. , Constantinescu, D., Racilă, M. - Teme de calcul integral, Ed.Sitech, Craiova, 2003, 2005

Predoi, M.,Constantinescu,D., Racilă,M. – Teme de Analiză matematică. Teorie și aplicații, Editura Universitaria,Craiova, 2008

SUBJECT: ALGEBRA AND GEOMETRY

NUMBER OF CREDIT POINTS: 5
SEMESTER: I
COURSE TYPE: core course
COURSE OBJECTIVES: Introducing the basic notions of linear algebra, analytic and differential geometry: vectorial spaces, linear applications, square shapes, Euclidean spaces, symmetrical operators, free vectors, straight lines and planes, conics and quadrics, plane and space curves, surfaces. The Tutorial is designed in order to deepen the theoretical knowledge and to establish calculation skills by means of practical applications
CONTENT: Vectorial spaces, Definition, examples. Properties, Linear dependence. System of generators, Basis and dimension. The coordination of of a vector relative to a base, Vectorial Subspaces: Definition, examples, operations with vectorial subspaces, linear applications, Definition, examples, Nucleus and image: Definition, rank theorem, matrix associated to a linear application, invariant subspaces. Eigenvalues and vectors, Diagonalizabile endomorphism, Blinear forms, Quadratic forms, Bilinear forms: Definition, examples, Symmetric bilinear forms and quadratic forms, Canonical form of quadratic forms (Jacobi and Gauss methods)Quadratic forms defined on a real vectorial space. Signatura, Euclidean vectorial spaces, Definition, examples, Orthogonality, norm, Cauchy's inequality, Orthonormal bases.Gram-Schmidt process, Ortho gonal complement of a subspace of an Euclidean space, Symmetric linear operators. Orthogonal transformation method, Free vectors (geometric). The notion of free vector. Real vectorial space of free vectors, Scalar product, Vectorial product, Mixed product, Cartesian orthonormal highlights, Right and plan, Right: geometric determination, equations,The distance from a point to a line.Angle of the two rights, Plan: geometric determination, equations, the distance from a point to a plane. Angle of the two planes, Common perpendicular to two noncoplanar straights, Conics and quadrics, General Cartesian equation of quadrics (conics). Center of symmetry, The intersection of a quadrics (conics) with a straight. Tangent plane to a quadrant, Reduction of a general quadrics Cartesian equation (conics) to a canonical form, Quadrics study (conics) in canonical equation , Curves in plane and in space,
Parameterized roads. Natural parameterization. Equivalent roads, Definition of the curve. Modes of representation. Tangent and normal.Normal plan, Curve. Torsion. Frenet's Triedrul. Frenet's formulae, Surfaces, parameterized blades. Surface, Curves on a surface, Coordinated curves. Singular and regular points, The tangent plane. The normal, The first fundamental form of a surface. The second fundamental form of a surface.
Examples of vectorial spaces. Linear dependence. System of generators. Basis and dimension The coordinates of of a vector relative to the base. Vector subspaces. Vectorial subspaces operations, Examples of linear applications. Nucleus and image. Associated matrix, Eigenvectors and values. Endomorphism diagonalizabile, bilinear forms, quadratic forms, canonical form of quadratic forms, Gauss method, Jacobi method Examples of Euclidean vectorial spaces, orthonormal bases. The Orthonormal bases.Gram-Schmidt process, Symmetric operators. Orthogonal transformation method, Free vectors operations. Changes of orthonormal cartesian landmarks, Problems with the right and the plan in space: equations, angles, distances, Examples of conics and quadrant. Issues related to the tangent plane, sphere, conics and cuadricelor bringing to the canonical form. Various Problems, Examples of curves in plane and in space. Plan tangent right, Determining of Frenet trihedral, of a curvature and the torsion for a curve. Surface examples. Tangent plane normal. Various exercises.
TEACHING LANGUAGE: Romanian
EVALUATION: written examination
BIBLIOGRAPHY:

Vladimirescu, I., Munteanu, F., Algebră liniară, geometrie analitică și geometrie diferenţială Ed. Universitaria, Craiova, 2007

Vladimirescu, I., Matematici aplicate, Repr. Univ. Craiova, 1987.

Vladimirescu, I., Popescu, M., Algebră liniară și geometrie analitică, Ed. Univ. Craiova 1994

Vladimirescu, I., Popescu, M., Alg. liniară, geom. n-dimensională, Ed. Radical, Craiova 1996

Radu, C., Algebră liniară, geometrie analitică și diferențială, Ed. ALL, București, 1998

Vladislav, T., Rasa, I., Matematici financiare și inginerești, Ed. Fair Partners, București, 2001

Udriște, C. s.a., Probleme de algebră, geometrie și ecuații diferențiale, EDP, București, 1981

Munteanu, F. s.a., Culegere de probleme de alg. liniară, geom. analitică, difer., Ed. Sitech, Craiova, 2009.

SUBJECT: PHYSICS

NUMBER OF CREDIT POINTS: 5
SEMESTER: I
COURSE TYPE: core course
COURSE OBJECTIVES: the course aims at introducing the basic notions in physics, necessary for the understanding of the specialized courses
COURSE CONTENT: Mechanics, The fundamental principles of mechanics, Systems of material points. Theorem of impulse variation, kinetics moment, energy, conservation laws, Analytical Mechanics, The principle minimal action, Lagrange equations of motion, Hamilton equations, Examples of solving the equations of motion, motion in the gravitational field, motion in elastic force-field oscillations and waves, wave equation, waves compounding, Lissajoux figures, Doppler effect, Electricity and Magnetism, Gauss's theorem, The classification of substances electrically, applications: dielectrics in an electric field – polarization, ferro-electricity, piezoelectricity, electro-stiction, electrets, pyro-electricity, electromagnetic induction - Faraday's Law, Maxwell Law - Ampere of the magnetic circuit, Maxwell equations, Electromagnetic waves - equations - solutions. General properties - reflection, refraction, interference, diffraction, Polarization of electromagnetic waves, Applications: - Fiber optic Quantum Mechanics, Stationary Schrodinger equation, Wavefunction. Conditions., The pit potential the potential barrier - the tunnel effect, Applications – 1 Cold emission, Tunnel Diode, Penetrating
Tutorial: Problems of vectorial calculation and vectorial analysis. Lagrange and Hamilton equations. Applications. Electricity Issues. Movement of charged particles in electric and magnetic fields The electronic cannon. Oscilloscope. The television. Charging and discharging through a resistor, coil-electric oscillations. Gauss Theorem Maxwell-Ampere Theorem
Laboratory: Uniform rectilinear motion study and the study of uniformly accelerated motion., Oscillations compounding, Lissajoux figures, Determination of specific heat, Thermal radiation law, Determination of the Stephan Boltzmann constant, Determination of refractive index
TEACHING LANGUAGE: Romanian
EVALUATION: written examination
BIBLIOGRAPHY:

Florea Uliu, Curs de fizică pentru facultatea de electrotehnică, Reprogr.Univ.Craiova
E. Luca și colaboratorii - Fizică, Editura Didactică și Pedagogică.
I.M. Popescu și colaboratorii - Probleme rezolvate de fizică, Editura Tehnică.
M. Puchin - Fizică, Editura Sitech..

SUBJECT: COMPUTER PROGRAMING

NUMBER OF CREDIT POINTS: 5
SEMESTER: I
COURSE TYPE: core course
COURSE OBJECTIVES: introducing the basic notions in computer programing, concepts and features introduced by the C programing language. Syntactic details of the C language are presented. The Tutorial tries to set the theoretical notions through program examples. The laboratory's purpose is to set the theoretical knowledge and to create programing skills using practical applications, homework and exercises to be solved.
COURSE CONTENT: Introduction. A brief C overview through solved and discussed examples. Structure of C program Language basics. Comments. Identifiers. Reserved keywords. Constants. Integer constants. Char constants. Floating-point constants. Arrays. Strings. Names and types. Statements. Portability. Specification of classes. Error control. Validity range and duration of life. Data types Fundamental types. Derived types. Void type. Typedef constants. Operators and expressions. Sizeof operator. Multiplying operators. Addition operators. Relational operators. Logical operators. Incrementing and decrementing. Operators for bit-level treatment. Assignment operator. Conditional operator. Comma operator. Explicit type conversions. Parenthesis, Evaluation order. Objects and "lvalue". Instructions, Void instruction. Labeled instructions. Expression instruction. Block instruction, Goto instruction. Decision instruction. Switch Instruction. While instruction. Do Instruction. For instruction. Break instruction. Continue instruction. Pointers definition. Declaration. Conversions of pointers. Pointer arithmetic. Arrays Declaration. N-dimensional arrays. Initialization. Arrays and pointers. Manipulation of strings. Arrays of pointers. Functions definition. Declaring functions. Defining functions. Transfer of parameters. Vector arguments. Declaring Structures Initialization. Possible operations. Arrays and structures. Pointers and structures. Structures and functions.Managing memory space. Bit fields. Unions. Standard functions. Borland C standard library. Functions description. Standard input / output library. Files description.
Laboratory: Data types, operators and expressions, Input / Output operations, Instructions, Pointers and arrays Multidimensional arrays, Iteration and recursive functions Stacks and queues, Library functions;
TEACHING LANGUAGE: Romanian
EVALUATION: written examination
BIBLIOGRAPHY:

Kernighan B.,Ritchie D.-The C Programming Language, Prentice Hall,88
Tombre K. - Petit guide du langage C ,89
Căprariu V.- Ghid de utilizare Turbo C 2.0 - Microinformatica,91
Drappier J.M.- C par exemples, Eyrolles
Duval C. - Graphiques en Turbo C,Eyrolles
M.Waite, et all ,"C Primer Plus", Howard W. Sans By Ca, 1986
Jamsa K., Klander L.- Totul despre C și C++. Manual fundamental de programare în C și C++. Teora 2002
Schildt H. – C manual complet. Teora 1998
Schildt H. – C++ manual complet. Teora 1998.

SUBJECT: PHYSICS AND TECHNOLOGY ELECTRONIC COMPONENTS

NUMBER OF CREDIT POINTS: 5
SEMESTER: I
COURSE TYPE: core course
COURSE OBJECTIVES: the course aims at introducing the basic notions in electronic circuits, passive electronic components, design of printed circuit boards and active and passive components technology.The laboratory activities are designed in order to improve the theoretical knowledge and the practical skills required for the performance measurement of passive circuit elements and of electrical circuits made with these.
COURSE CONTENT: Basic electricity concepts. The electric charge. International System of measurement units. The electrical current. The voltage. Dependent sources. Electric power. Electrical resistance Energy, Ohm's Law. The resistivity of a material. Temperature effects on the resistance. Resistors. The power dissipated by a resistor. The nominal value of a resistor resistance and its tolerance.

Open circuits and short circuits. Internal resistance. DC Circuits in series and parallel. Sides, knots, loops, mesh, series and parallel connection of components. Kirchhoff's Voltage Law and series connection of components. Voltage divider. Kirchhoff's theorem for currents and parallel connection of resistors. Current divider, Continuous current circuit analysis. Cramer's rule. Sources transforming. Circuit analysis with current method on meshes or loops. Circuit analysis with the method of potentials at nodes. Dc-equivalent circuits, Network theorems and bridge circuits. The theorems of Thevenin, Norton and of the maximum power transfer. Superposition theorem and Millman's theorem. Triangle star transformations and reverse. Bridge circuits Condensers and electrical Chapacity. Electric Chapacity and condensers construction. The Chapacity of some group series and parallel condensers. The energy stored in a condenser. Currents and voltages that vary over time. Electrical power through condensers. Circuits with condensers, DC resistances and switches and applications. Coils and their inductance. Magnetic flux and coils. Current-voltage relationship in a coil and inductance of some coil connections. The energy stored in coils. Circuits with resistances and coils in dc. Voltage and current circuits. Periodic signals, sinusoidal signals and osinusoidal signals. Behaviour of resistors to sinusoidal signals rms values of voltage and current. Inductance behaviour to the application of sinusoidal sources. Behaviour of condensers to the application of sinusoidal sources Algebra of complex numbers and vectors. Imaginary numbers. Representation of complex numbers in the the plan. Phasors. Elemental analysis of the ca. circuits. Impedance and Admissions. The description of the circuit elements through phasors. Series AC circuit analysis. The concept of impedance. AC parallel circuit analysis. The notion of admittance Real electronic components. EC Quality. EC standardization. Tolerance class. Safe operation of the EC. Real electronic components. Quality factor, the loss angle. Resistors. Definition classification and characteristics of fixed resistors. Fixed resistors. Parameters and the technology ofvariable Resistors. Nonlinear resistors. Technical resistors. Condensers. Definition, classification and characteristics of fixed condensers. Fixed condensers technology. Features and condensers technology. Technical condenser. Coils and transformers. Coils and transformers construction and technology. Parameters of coils and transformers. Models for coils and transformers. Techniques for achieving PCB. General rules for component placement. Introducing the stages of the printed circuit. SMT technology. Techniques and tools used to weld components. Introduction to Integrated Circuit Technology Basics of semiconductor technology. CMOS technology for passive and active components.

Laboratory: Safety training. Presentation of laboratory equipment. Resistance measurements, dc voltages and continuous currents. Power supplies, signal generators and multimeters. Use of the oscilloscope The study of the fixed and variable resistors. Study of fixed and variable Chapacitors. Determination of coils and coupled circuits electrical performance Simulation and modeling of simple circuits with JAVA APPLET Recovery sessions. Study of oscillating circuit series. Study of paralel oscillating circuit series . Passive RC high pass filter and low pass. Recovery sessions.. Final laboratory evaluation.

TEACHING LANGUAGE: Romanian

EVALUATION: written examination

BIBLIOGRAPHY:

John O Maley, “Theory and Problems of Basic Circuit Analysis”. McGraw Hill Compsany, 1982

M.I.Mihaiu, „Tehnologie electronică”, Editura Universitaria Craiova, 2005

Radu Ovidiu "Componente electronice pasive -catalog " ET. București 1982

SUBJECT: APPLIED INFORMATICS

NUMBER OF CREDIT POINTS: 3

SEMESTER: I

COURSE TYPE: core course

COURSE OBJECTIVES: Notions and fundamental concepts for access and efficient search of information sources on Internet

COURSE CONTENT: 1. Human communication concepts 2. Representation of information in computer 3. Internet and www 4. General rules for resources acess of forum type 5. Efficient reading techniques 6. General writing rules for technical documents 7. Writing and presentation of written works Laboratory: 1.Introducing laboratory topics 2. Advanced techniques for efficient search of information on Internet 3. Construction of a personal web page. 4. Access to the forum 5. The role and the drafting of intent letters 6. The role and the drafting the autobiographical abstract 7. CV Preparation 8. Computer information representation 9. Learning to work with Excel 10. Learning to work with PowerPoint 11. Recoveries

TEACHING LANGUAGE: Romanian

EVALUATION: Colloquim

SELECTIVE BIBLIOGRAPHY:

Susan Stellin: Resumes and Cover Letters, Burnes Publishing, New York, 2004, ISBN: 0760737924

Writing Guidelines for Enginering and Sceince Students

SUBJECT: ENGLISH 1

NUMBER OF CREDIT POINTS: 2

SEMESTER: I

COURSE TYPE: complementary

COURSE OBJECTIVES: the course aims at familiarizing the students with various technical terms and improving some of the most important concepts of English grammar

CONTENT: Topic: Do You Know how to Write a CV? (Conversation & exercises) Grammar: Present Tense (exercises) Topic: ABC-s Viruses (conversation & exercises) Grammar: Past Tense (exercises) Topic: The Sol Grammar revision Grammar: Present Perfect tense (exercises) Topic: About Computers Conversation Grammar: Past Perfect Tense (exercises) Grammar: Future Tense (exercises) Topic: Christmas (exercises, debate, questions) Carols and conversation about Christmas Revision

TEACHING LANGUAGE: Romanian

EVALUATION: Colloquim

BIBLIOGRAPHY:

Marin Cristina, English Textbook, Ed. Universitaria, 2005

Michael Brookes, Francois Lagoutte, Engleza pentru Informatica, Ed. Teora, 1997

Andrei Bantas, Limba engleză pentru stiință și tehnică, Ed. Niculescu, 1999

SUBJECT: PHYSICAL EDUCATION

NUMBER OF CREDIT POINTS: 3

SEMESTER: I

COURSE TYPE: complementary

COURSE OBJECTIVES: 1. Health strengthening and increase exercise Chapacity, 2. Developing basic motor skills and sports specific skills, 3. Interest stimulation and building Chapacity for independent systematic practice.

COURSE CONTENT: 1. Harmonious physical development -

aerobics program (girls). Bilateral Game: table tennis, basketball and football - 1h 2. Speed running 30-50 m, with start in different positions Improving of volleyball technical elements: fundamental position, care up with two hands, one hand down service - 2h 3. Harmonious physical development - aerobics program (girls). Bilateral Game: table tennis, basketball and football - 1h 4. Improvement in standstill long jumping; Complex development of the main muscle groups - 2h 5. Harmonious physical development - aerobics program (girls). Bilateral Game: table tennis, basketball and football - 1h 6. Running strength improvement; Improvement of volleyball technical elements: attack hit, blockage, up service - 2h 7. Harmonious physical development - aerobics program (girls). Bilateral Game: table tennis, basketball and football - 1h 8. Preparation of evaluation tests: speed running - 50 m, long jump from standstill, resistance running Bilateral volleyball game - 1h 9. Harmonious physical development - aerobics program (girls). Bilateral Game: table tennis, basketball and football- 1h 10. Evaluation standards and tests: speed running - 50 m, long jump from standstill, resistance running - 800m girls, 1000m boys - 2h

TEACHING LANGUAGE: Romanian

EVALUATION: Sports tests

SELECTIVE BIBLIOGRAPHY:

SUBJECT : SPECIAL MATHEMATICS

NUMBER OF CREDIT POINTS: 5

SEMESTER: II

COURSE TYPE: core course

COURSE OBJECTIVES: The course introduces some chapters of mathematics which can be further applied as investigation instruments for engineers and special language typical for the specialised subjects. The Tutorial follwos the same course topics .

COURSE CONTENT: 1. Elements of the theory of functions of a complex variable 1.1. Complex numbers. Riemann sphere. 1.2. Convergence of sequences and series of complex numbers. 1.3. Continuity. Invariants of continuous transformations. 1.4. Complex derivatives. Cauchy-Riemann conditions. Determination of holomorphic functions. 1.5. The complex integral. Cauchy theory. The method of residuals. The calculation of real integrals. 2. Ordinary Differential Equations 2.1. Modeling with differential equations. Types of solutions. Families of curves and singular solutions. 2.2. Classical types of explicit and implicit differential equations. Total differential equiations. Integrating factor. 2.3. Equations of higher order. Cases of order reduction. 2.4Linear equations of higher order. Ecuaţii cu coeficienţi constanţi. 2.5. Systems of ordinary differential equations. Theorem of existence and uniqueness of the solution of the Cauchy problem. Symmetric systems. 2.6. Linear systems. The case of constant coefficients. 3. Elements of Fourier Analysis 3.1. Periodic signals. Fundamental problems of Fourier analysis 3.2. Fourier coefficients. The spectrum of a signal 3.3. Dirichlet's formula for partial sums. The spot convergence criterion. 3.4. Non-periodic signals. The Fourier integral. 3.5. Fourier transformation. Sin and cos transformation.

TEACHING LANGUAGE: Romanian

EVALUATION: written examination

SELECTIVE BIBLIOGRAPHY:

Predoi M., Bălan T. Mathematical Analysis, Ed. Universitaria, Craiova, 2005

Bălan T., Dăneţ C., Ecuaţii diferenţiale, Ed. SITECH, Craiova, 2007

Bălan T., Şterbeţi C., Analiză complexă, Ed. MJM, Craiova, 2003

Bălan T., Şterbeţi C., Analiză Fourier, Ed. SITECH, Craiova, 2001

Bălan T., Matematici Speciale, Reprografia Universităţii din Craiova, 1980

Ablowitz M, Fokas A.S., Complex Variables, Cambridge University Press, 2003

Polya G., Latta, G., Complex Variables, John Wiley & Sons, 1974

Debnath, L, Bhatta, D. Integral Transforms and Their Applications, Chapmann & Hall /CRC, 2007.

SUBJECT : NUMERICAL METHODS

NUMBER OF CREDIT POINTS: 5

SEMESTER: II

COURSE TYPE: core course

COURSE OBJECTIVES: The course is intended to introduce the main numerical methods and numerical algorithms. The course aims to develop the ability to analyze various engineering mathematical models based on numerical techniques to and to solve specific problems and programming languages by translating numerical methods. The laboratory classes aime at a deep understanding and optimal algorithmic concepts presented in the course, taking into account the construction of numerical codes and their testing on different types of applications.

COURSE CONTENT: Chap. 1 Numerical methods in algebra 1.1 Types of matrices and matrix transformations applied to solve linear systems. 1.1.1 Square matrix of n order with real elements. 1.1.2 Diagonal matrix; particular case: the unit matrix of n order 1.1.3. Higher (lower) triangular Matrix of n order. 1.1.4. Band Matrix of n order. 1.2. Matrix transformations applied to solving linear systems. 1.2.1. LR factorization matrices of n order with real elements; the tridiagonal and pentadiagonal case.1.2.2. Iterative methods: Jacobi, Gauss-Seidel, (rare matrices). Convergence study. 1.2.4. Calculating the determinant and the inverse of a matrix. 1.2.4.1. Pivotal condensation method. 1.2.4.2. Gauss method. 1.2.4.3. LR factorization method. 1.2.4.4. Gauss and iterative methods for determining the inverse of a matrix.1.3 Numerical methods for solving systems of nonlinear equations 1.3.1 Newton Method for solving equations and systems of linear equations; Studiul convergentei. 1.3.2 Modified Newton method for solving systems of nonlinear equations numerically. 1.3.3 Bairstow method for the numerical solution of algebraic equations. 1.4. Determination of the characteristic polynomial and of the values and eigenvectors for real square matrix. 1.4.1. Method of diagonal minors. 1.4.2. Leverrier Method 1.4.3. Krylov Method (the possibility to determine eigenvectors) 1.4.4. Fadeev Method (the possibility to determine the inverse matrix)1.4.5. Danilevsky Method (the possibility to determine the eigenvectors))1.4.6. LR Method to calculate values and eigenvectors.1.4.7.The Newton type iterative Method to estimate extreme eigenvalues of a real symmetric matrix Chap. 2 Function Approximation 2.1. Single and multiple nodes interpolation. 2.1.1. Lagrange interpolation polynomial. Error minimizing. 2.1.2. Newton interpolation polynomial. Error minimizing. 2.1.3. Hermite interpolation polynomial. 2.1.3. Interpolations by cubic splines. 2.1.4. Approximation by the method of the least squares - discrete case. Chap. 3 Numerical methods for evaluating integrals 3.1 Evaluation of simple integrals 3.1.1. Numerical approximation on two nodes (trapezoid formula).3.1.2. Numerical approximation for three knots (formula Simpson) 3.1.3. Numerical Approximation of four nodes (Newton formula) 3.2. Evaluation of double integrals on convex domains of the polygonal border.Chap. 4 Numerical methods for solving differential equations and

partial differential 4.1. Differential equations of first order and higher order with initial condition (Euler Runge-Kutta method) 4.2. Ordinary differential equations with bi-local conditions (pb. Sturm-Liouville). 4.3 Operators with finite differences; types of partial differential equations of second order. 4.4. Partial differential equations of second order - elliptic type, method of finite differences. Chap. 5 Elements of probability and mathematical statistics 5.1 Random Events; probability spaces. 5.1.1 Random events, probability, probability finite field. 5.1.2 Conditioning: conditional probability, independent events, product spaces. 5.2 Discrete random variables. 5.2.1 Random variables, the law of a random variable, Operations with random variables. 5.2.2 Independent random variables. 5.2.3 Moments of a random variable. 5.3 Customary laws of probability. 5.4 Mathematical Statistics. 5.4.1 General concepts. 5.4.2 Graphical representation of statistical series.5.4.3 Characteristic elements of a statistical series. 5.4.4 Polls.
Laboratory:
1. Solving systems of linear algebraic equations: Gauss method, LR factorization (Doolittle, Cholesky), iterative methods (Jacobi and Gauss-Seidel). 2. Calculating the determinant and the inverse of a matrix (Gauss method, pivotal condensation method and the iterative method). 3. Characteristic polynomial values and eigenvectors (methods: minor diagonal, Fadeev, Leverrier, Krylov, LR, Danilevsky). Solving nonlinear equations (Bairstow method). Lagrange polynomial interpolation, Newton, Hermite, Interpolation by cubic splines, approximation by the method of the least squares. 5. Numerical evaluation of simple integrals (method trapezium, Simpson, Newton). Numerical evaluation of double integrals. 6. Ordinary Differential Equations: Euler method, Runge-Kutta methods, systems of ordinary differential equations. 7. Partial differential equations - elliptic type. Finite difference method. 8. Random events, discrete random variables, the moments of random variables, laws of probability. 10. Mathematical statistics

TEACHING LANGUAGE: Romanian

EVALUATION: written examination

SELECTIVE BIBLIOGRAPHY:

Burden R. L., Faires J. D., Numerical Analysis, Brooks Cole Ed., 2007.

C de Boor, A practical guide to splines, 2nd ed. Springer, New York, 2000.

Ciarlet P.G., Introduction à l'Analyse Numérique et l'Optimisation, Ed. Masson, Paris, 1990.

Chatelin F., Spectral approximation of linear operators, Academic Press, New York, 1983.

Demidovici B., Maron I., Éléments de Calcul Numérique, Ed. Mir Moscou, 1973.

Ebânca D., Metode numerice în algebră, Editura Sitech, Craiova, 2005.

Mihoc Gh., Micu N., Teoria probabilităților și statistică matematică, E. D.P., București, 1980.

Militaru R., Méthodes Numériques. Théorie et Applications, Ed. Sitech, Craiova, 2008.

Philips G., Taylor T., Theory and Applications of Numerical Analysis, Academic Press, 1999.

Popa M., Militaru R., Analiză Numerică , Note de curs, Ed. Sitech, Craiova, 2003.

Popa M., Militaru R., Metode numerice în pseudocod - aplicații, Ed. Sitech, Craiova, 2010

SUBJECT : BASES OF ELECTRICAL ENGINEERING

NUMBER OF CREDIT POINTS: 6

SEMESTER: II

COURSE TYPE: field related

COURSE OBJECTIVES: The course aims at introducing, understanding and deepening the fundamentals of electromagnetic field theory and the theory of electrical circuits. The Tutorial is aimed at establishing specific concepts in electrical and electronic engineering applications, focusing on qualitative interpretations and quantitative assessments. The laboratory classes develop the practical skills and contribute to the understanding of the concepts taught by both experimental observations and numerical simulations.

COURSE CONTENT: A. Basic concepts of electromagnetic field theory and its applications in electrical engineering and electronics 1. Concepts of electrostatics: state of electrification, the state of polarization, the stationary electric field; Stationary electric potential; voltage and properties; electric flux law; the electric field in the conductor; electric condenser and the Chapacity; condenser networks. 2. Steady Electrokinetics Concepts: electrical conduction state; the conservation law of electric charge; electrical conduction law; Joule's law. 3. Concepts stationary magnetic field: permanent and temporary magnetization state; ferromagnetic bodies; law flux; magnetic fields with spatial symmetry. 4. The variable regime of the electromagnetic field: law of electromagnetic induction; magnetic circuit law; 5Magnetic circuits and inductivities..B. Basic concepts of the electrical circuits theory of 1. Introduction: circuit elements; operating modes; topology; general mathematical models. 2. DC linear circuits. Basic concepts of nonlinear circuits. 3. Sinusoidal AC circuits. 4. Transient linear circuit. 5. Cuadripols and electrical filters. 6. Basic concepts of circuits with distributed parameters.
Tutorial:
1. The calculation of electric fields with spatial symmetry 2. Calculation of the electric Chapacity and Chapacitors network analysis 3. Using magnetic circuit law to calculate the magnetic fields 4. Applications to the law of electromagnetic induction, electric conduction law and Joule's law 5. Calculation of own mutual and dispersion inductance 6. DC circuit analysis I; using Kirchhoff's Laws 7. DC circuit analysis II; method nodal use and other operational methods 8. Using the right task simple nonlinear circuit analysis. 9. Analysis of c.a. sinusoidal circuits I: complex images, The phase diagrams, Kirchhoff's theorems 10. Analysis of c.a. sinusoidal circuits II: operative methods of analysis, resonance problems 11. The transient regimes analysis first in 1^{st} order circuits. The importance of initial conditions. 12. The transient regimes analysis in higher-order circuits. Using operational method. 13. Calculation of basic parameters of passive cuadripols and of cuadripol chains. 14. Applications to the propagation of signals by conductors which are comparable to the wavelength
Laboratory:
A. Experimental works 1. introductory paper: introducing specific lab equipment and labor safety rules 2. Experimental study of electromagnetic induction law 3. Study of specific theorems DC circuits 4. Study of nonlinear circuit elements 5. Study of RLC circuit in c.a. and resonant voltage 6 The study of the transient regimes in circuits RC and RLC B. Works circuits numerical simulation 1. Introductory paper: presenting laboratory and numerical simulation analysis, presentation program PSpice Chapabilities, work demonstration 2. Create PSpice applications, content projects, choosing the component library, create source programs 3. Determining the operating point in the linear circuit 4. Determination of operating points of nonlinear circuits and building the static characteristics 5. Analysis of linear circuits in sinusoidal. 6 Construction of frequency

characteristics. Analysis of the transient regimes in linear circuits. Adapting numerical integration parameters 7. The transient regimes analysis of circuits with active components, the baseline management 8. Students evaluation

TEACHING LANGUAGE: Romanian

EVALUATION: written examination

SELECTIVE BIBLIOGRAPHY:

A. Timotin, V. Hortopan, A. Ifrim, M. Preda, Lecţii de Bazele electrotehnicii, Ed. Didactică și Pedagogică,București, 1970.

L. Mandache, Teoria circuitelor electrice, notiţe de curs, Facultatea de Electrotehnică, 2006.

M. Badea, L. Mandache, Electrodynamique, Ed. Aius, Craiova, 2004.

M. Iordache, L. Dumitriu, Teoria modernă a circuitelor electrice, vol I, II, Editura All, București 2000.

L. Mandache, Analiza asistată de calculator a circuitelor electrice, Editura Sitech, Craiova, 2004.

R. Răduleț, Bazele electrotehnicii – probleme, vol. I, II, Ed. Didactică și Pedagogică, București, 1981.

L. Mandache, P.M. Nicolae, M. Ardeleanu, I. Sirbu, D. Stănescu, Bazele electrotehnicii, îndrumar de laborator pentru specializarea Electronică aplicată, 2007, exemplar online.

L. Mandache, Simularea PSpice a circuitelor electrice cu parametri concentraţi, îndrumar de laborator pentru specializarea Electronică aplicată, 2009, exemplar online.

L. Mandache, D. Topan, Simularea circuitelor electrice. Algoritmi și programe de calcul, Ed. Universitaria,Craiova, 2009.

SUBJECT: ELECTRONICS MATERIALS

NUMBER OF CREDIT POINTS 5

SEMESTER: II

COURSE TYPE: field related

COURSE OBJECTIVES:

The course aims to present the basics of materials used in electronics ie conductive materials, insulating materials, semiconductor materials and electronic devices made structures in semiconductor technology. The laboratory is designed to improve the theoretical knowledge and practical skills of materials and electronic devices simulation by means of the program MATLAB.

COURSE CONTENT: 1. Basiscs of material structure. The structure of the atom. Types of atomic bonds in solids. Kinetic-Molecular Theory. Thermally activated processes. The crystalline state. Defects in crystals. growth of a single crystal. Amorphous semiconductors. Solid solutions and two phase solutions. 2. Electrical and thermal conduction in solids. The classical Drude model. The temperature dependence of resistivity. Hall effect and devices The thermal conductivity. 3. Basic Quantum Physics. Photon and the electron wave. Hydrogen and helium atoms 4. The modern theory of solids. Energy bands. Semiconductors. The Quantum theory of metals. Semiconductors. Intrinsic and extrinsic semiconductors. Temperature dependence of conductivity. Diffusion and continuity equations. Optical absorption and luminescence. 5. Conductors and superconductors. The electrical conduction in solid conductors. The functions of the conductive materials. Superconducting state 6. Dielectric material. Types of polarizations. Dielectric functions their uses. Travel and orientation polarization of dielectrics. Dielectric rigidity. 7. Magnetic materials. Types of magnetization. Ferromagnetism. Piezo-magnetism. 8. Structures of discrete semiconductor devices. Different types of diodes and transistors, multi-junction and optoelectronic devices. Limitations in the use of electronic devices. 9. Integrated circuit structures. Bipolar technology, CMOS technology. .

Laboratory:

Training for occupational safety. Introduction to MATLAB 2. Basic concepts in MATLAB using. 3. Using MATLAB graphics facilities. 4. MATLAB simulation of electrical material. 5. MATLAB programs to simulate diodes. 6. MATLAB programs to simulate transistors. 7. Final laboratory evaluation and laboratory recoveries

TEACHING LANGUAGE: Romanian

EVALUATION: written examination

SELECTIVE BIBLIOGRAPHY:

S.O.Kasap. „Principles of Electronic Materials and Devices”, Mc Graw Hill, 2006, ISBN: 0072456361

M. I. Mihaiu, Materiale pentru electronică - Curs plasat pe Internet http:// electronics.ucv.ro/mihaium

M. Drăgulănescu, A. Manea, ”Materiale pentru electronică”, Vol. I și Vol. II. Editura Albastră Cluj Napoca, 2001.

SUBJECT : PROGRAMMING LANGUAGE AND DATA STRUCTURE

NUMBER OF CREDIT POINTS 5

SEMESTER: II

COURSE TYPE: core course

COURSE OBJECTIVES: The course aims to develop skills related to the design of data structures that allow the writing of effective programs, dveloping skills for the representation of static objects and the processing of dynamic objects as well as the ability to control the ratio of the relative performance of the program memory consumption / release speed.

The laboratory is designed to improve the knowledge and programming skills and to develop practical applications, exercises and problems

COURSE CONTENT: 1. Chap 1. Information Tree structures 1.1 Definitions and elementary algorithms 1.2 Implementing the presented algorithms 1.3 Representation and exploration of tree information structures Chap 2. Ordered trees 2.1 Definition of the search trees 2.2 Implementing trees 2.3 Information retrieval in the search tree 2. of a node in a search tree Chap3. Optimal search trees 3.1 Building an optimal tree in searching 3.2 Algorithms for optimal construction of a tree in searching 3.3 Application: Huffman codes Chap4. Balanced trees 4.1 Definitions. Theorems 4.2 Nodes in balanced trees insertion technique 4.3 Suppression of nodes in the balanced trees Chap5. Multi ways trees 5.1 Trees 3-2 5.2 Algorithms used to inserting a key in a tree 3-2 5.3 Algorithms used to delete a key in a tree 3-2 Chap6. B Trees 6.1 Algorithms used to inserting a key in a B tree 6.2 Algorithms used to delete a key in a B tree Chap7. Graph type structures 7.1 Scroll DEPTH-FIRST method for unorientated graphs 7.2 Scroll DEPTH-FIRST method for orientated graphs 7.3 Scroll BREADTH-FIRST method 7.4 Default graphs and trees 7.5 Graphs and games theory 7.6 BRANCH-AND-BOUND method

Laboratory:

1. Hash tables 2. Binary Trees / Search trees 3. Classes of balanced trees 4 Optimal Trees 5. Multi ways trees 6. B/B trees 7. TRIE 8 trees. Graphs

TEACHING LANGUAGE: Romanian

EVALUATION: written exam

BIBLIOGRAPHY:

Burdescu D.D. - Algoritmi și structuri de date, Ed. Mirton, 1992.

Burdescu D.D. - Structuri de date arborescente, Ed. Mirton, 1993.
Burdescu D. D. - Structuri de date arborescente (curs) Reprografia Universității din Craiova, 1993.
Burdescu D.D. ,Brezovan M - Algoritmi și structuri de date în C și Pascal (indrumar de laborator), ReprografiaUniversitatii din Craiova, 1995.
Burdescu D. D., Brezovan Marius, Cosulschi Mirel - Structuri de date arborescente în C și Pascal (indrumar de laborator), Reprografia Universității din Craiova, 2000.
Burdescu D.D. ,Badica Costin - Structuri de date (culegere de probleme) Reprografia Universității din
Craiova, 1994.
Tremblay, Jean Paul, Sorenson, Paul - An Introduction to Data Structures with Applications - Mc Graw-Hill, 1984.
Weiss, Mark Allen - Data Structures and Algorithm Analysis, Benjamin - Cummings, Publishing Company 1992.
Horowitz Ellis - Fundamentals of Data Structures în PASCAL , Computer Science Press 1983
Cormen Thomas, Leiserson Charles, Rivest Ronald - Introduction to Algorithms, M.I.T. Press 19929. Schild, H., Manual complet C++, Ed. Teora, 2003.
Somnea, D., Turturea, D., Introducere în C++, Programarea orientată pe obiecte, Ed. Tehnică, București, 1993.

SUBJECT: COMPUTER AIDED GRAPHICS

NUMBER OF CREDIT POINTS: 2
SEMESTER: II
COURSE TYPE: core
COURSE OBJECTIVES: The course aims to introduce the basics of Computer Graphics: theoretical concepts of technical graphics, two-dimensional and three-dimensional modeling in AutoCAD, general aspects of computer graphics. The laboratory classes are designed in order to develop the theoretical knowledge by means practical application of graphics AutoCAD.
COURSE CONTENT: Chap. 1General concepts of technical drawing 1.1. The object and purpose of the technical design 1.2. About Romanian standards 1.3. Classification of technical drawings 1.4. Formats 1.5. Lines used in industrial technical drawing 1.6. Standardised writing 1.7. Indicator 1.8. The folding 1.9. Systems of representation 1.10. Layout projections 1.11. Views, sections and ruptures 1.12. Technical drawings realisation 1.13. Dimensioning in the technical design 1.14. Thread representation, rating and grading 1.15. Overall drawing Chap. 2. General aspects of computer graphics (Computer Graphics) 2.1. About Computer graphics 2.2. The evolution of computer graphics 2.3. A brief history of the CAD concept o(Computer Aided Design) 2.4. Classification of CAD products 2.5. CAD placement in enterprise. New Concepts 2.6. Concepts and CAD related software concepts Chap .3. Bidimensional modeling 3.1. Introduction to AutoCAD 3.2. Drawing with AutoCAD 3.3. Editing in AutoCAD 3.4. Dimensioning in AutoCAD 3.5. Hatching in AutoCAD Chap. 4. Three-dimensional modeling 4.1. Coordinating systems 4.2. Modelling Commands. Generating primitives 4.3 Operations with predefined solids 4.4. Commands to generate three-dimensional surfaces 4.5. Three dimensional visualization commands
Laboratory:
1. General rules used in technical graphics 2. Application 1: geometric constructions 3. Application 2: indicator 4. Application 3: generating a board contour. Assigment 5. Application 6: sketch. Assigment 6. Application 7: simple part Assigment 7. Application 8: rated part 8. Application 8: layout projections of a part 9. Application 9: electronic scheme 10. Application 9: complex part. Assigment 11. Application 10: threaded fasteners 12. Application 11: Three dimensional part 13. Suggested Application (checking tickets)14. Students eveluation
TEACHING LANGUAGE: Romanian
EVALUATION: Colloquim - practical application
BIBLIOGRAPHY:

Gherghina, G., Popa D., Calbureanu M., Tudor M., Grafică asistată de calculator, Reprografia Universității din Craiova, 1999;
Gherghina, G., Popa, D., Calbureanu, M., Tudor, M. , Grafică asistată de calculator. Două modalități de abordare, Reprografia Universității din Craiova, 2000 ;
D. Popa, Grafică asistată de calculator, Ed. Sitech, 2003, 154 pag., ISBN 973-657-444-X
Popa, D., Sass, L., Gherghina, G., Duță, A., Stănescu, G., Grafică asistată de calculator - de la 2D la 3D, 247 pag., Ed. Sitech, 2007
Sass, L., Desen geometric, 280 pag., Ed. Tehnică-Info, Chișinău, 2002
D. Popa, L. Sass, Grafică asistată de calculator, Ed. Sitech, pp. 269, ISBN 978-973-746-800-0, Craiova 2008

SUBJECT: ENGLISH 2

NUMBER OF CREDIT POINTS: 2
SEMESTER: II
COURSE TYPE: complementary
COURSE OBJECTIVES: the course aims at familiarizing the students with various technical terms and improving some of the most important concepts of English grammar
COURSE CONTENT: Grammar: The Pronoun, IT IS &There is. Exercises Topic: Computer's Devices Grammar: The Verb; Present Tense Simple &The Present Tense Continuous. Exercises Topic: Text about English Language Grammar: Past Tense Simple & Past Tense Continuous. Exercises Grammar: Irregular verbs. Exercises Topic: Text Grammar: Present Perfect tense. Exercises Topic: Computer's Security Composition, reading, key-words, debate Grammar: Past Perfect Tense. Exercises Topic: Food and Climate Change Composition, reading, key-words, debate Grammar: The Future, means of expressing futurity. Exercises Topic: Do you know how to write a CV? Conversation, a Cv model Grammar: The Sequence of Tenses. Exercises REVISION
TEACHING LANGUAGE: Romanian
EVALUATION: colloquim- oral exam
SELECTIVE BIBLIOGRAPHY:

1. Marin Cristina, English Textbook, Ed. Universitaria, 2005
2. Michael Brookes, Francois Lagoutte,Engleza pentru Informatică, Ed.Teora, 1997
3. Andrei Bantaş, Limba engleza pentru ştiinţă și tehnică, Ed. Niculescu, 1999

SUBJECT: BASES OF MECHANICAL ENGINEERING

NUMBER OF CREDIT POINTS: 3
SEMESTER: II
COURSE TYPE: Complementary
COURSE OBJECTIVES: The course aims to introduce basic concepts regarding the issue of mathematical building methods on the motion of constant mass mechanical system models o with movement and a finite number of freedom degrees. Their analysis is accompanied by examples of computing applications illustrating the methods studied.
COURSE CONTENT: 1 The theory of sliding vectors 1.1. The polar moment. 1.2. The axial moment. 1.3. Reduction of the vector systems. 2 The geometry of masses 2.1. Weight.

masses center: definitions, properties, Guldin-Pappus theorems.2.2. Moments of inertia: definitions, properties, change in moments of inertia, tensor of inertia, ellipsoid of inertia. 3 Kinematics of the material point 3.1. The trajectory, speed and acceleration in different coordinating systems. 3.2. Relative motion knematics of the material point. 4 the Kinematics of rigid solid and rigid systems 4.1. General movement of the rigid solid: degrees of freedom, velocity and angular acceleration, linear velocity field, axoidele movement, linear acceleration field. 4.2. Particular movements of the rigid solid. 4.3. The relative movement of the solid rigid with applications in the industrial construction of robots. Kinematic chains. 5 Dynamics 5.1. Fundamentals of dynamics, the potential, the mechanical work. 5.2. Notion of kinetics: the momentum, kinetic moment, kinetic energy. 5.3. Dynamics fundamental theorems of. 5.4. The motion of the material point and of the point systems subject to links. 5.5. Methods of study in the dynamics of the rigid solid and of the rigid systems. Reduced Models.

Tutorial:

Mass Centers 2. Moments of inertia 3. Kinematics of the material point 4. The Kinematics of the rigid solid and the rigid systems (kinematic chains)5. The dynamics of the material point 6. Dynamics of the rigid solid and the rigid systems

TEACHING LANGUAGE: Romanian

EVALUATION: oral examination

BIBLIOGRAPHY:

Băgnaru, D., Cătăneanu, A., Mecanică-Mecanisme, Editura Sitech, Craiova, 1997

Buculei, M., Mecanică, vol. I, II, Reprografia Universității din Craiova, 1980

Cătăneanu, A., Mecanică, vol. I,II, Editura Universitaria, Craiova, 2000, 2001

Cătăneanu, A., Mecanică –Culegere de probleme Ed. Universitaria, Craiova, 2002

Ceauşu, V, Enescu, N., Ceauşu, F., Culegere de probleme, Mecanică, vol. I. Statica și cinematica, Ed. Printech, București, 1997

Darabonţ, A., Vaiteanu, D., Munteanu, M., Mecanica tehnica. Culegere de probleme, Ed. Scrisul Românesc, Craiova, 1983

Ispas, V., Aplicațiile cinematicii în construcția manipulatoarelor și roboților industriali, Ed. Academiei Române, București 1990

Mangeron, D., Irimiciuc, N., Mecanica rigidelor cu aplicații în inginerie, Vol. I, II, III, Ed. Tehnică, București,1978, 1980, 1981

Merches, I., Burlacu, L., Applied Analytical Mechanics, The Voice of Bucovina Press, Iaşi, 1995

Staicu, St., ş.a, Probleme de mecanică teoretică. Mecanică analitică, Universitatea Politehnica București,1996

Voinea, R., Voiculescu, D., Simion, F. P., Introducere în mecanica solidului rigid cu aplicații în inginerie, Ed. Academiei.

2-ND YEAR

SUBJECT: ELECTRONIC DEVICES

NUMBER OF CREDITS: 6
SEMESTER: I
COURSE TYPE: field related
COURSE OBJECTIVES: The course aims both at introducing the core concepts necessary for understanding the operation and use of multi-junction, bipolar and unipolar electronic devices, as well as learning methods of analysis and design of basic amplification floors. The Tutorial is designed to improve the knowledge and to create the proper skills for the calculus through exercises and problems. The laboratory is designed to better the knowledge and to form the necessary skills for the use of electronic devices through practical applications.
COURSE CONTENT: 1. Basic notions about semiconductor physics.1.1. Intrinsic and extrinsic semiconductors.1.2. Transport of charge carriers in semiconductors.1.3. The basic equations of semiconductor devices.2. P-N Junction, Diodes.2.1. The static characteristics of the p-n junction.2.2. The dynamic regime of the p-n junction (small signal condition, the small signal model of the p-n junction, the large signal model of the p-n junction).2.3. Types of diodes. Diode circuits. 3. Metal-semiconductor contact.3.1 The N-type metal-semiconductor 3.2 The P-type metal-semiconductor 3.3 The Schottky diode 4. The bipolar transistor 4.1. The transistor effect and the relationship between the currents through the transistor. 4.2. The transistor connections and its operating regime. 4.3. The large signal model of the bipolar transistor and the static characteristics of the bipolar transistor 4.4. Polarization circuits of the bipolar transistor and limitations in its functioning 4.5. The bipolar transistor in dynamic regime: the small signal model and examples of how to use the equivalent circuit of low frequency. 4.6. The performance of the bipolar transistor at high frequencies. 5. The field effect transistor with junction. 5.1. TECJ's physical structure and its modeling. 5.2. Static characteristics. 5.3. Polarization circuits 5.4. The small signal. 5.5. Amplification stages. 6. The MOS transistor. 6.1. The MOS Chapacitor. 6.2. The operating principle and types of MOS transistors. 6.3. Static characteristics of MOS transistors and the polarization of the MOS transistor circuits. 6.4. The Small signal regime of the MOS transistor. 7 The switching Regime of semiconductor devices. 7.1. The switching regime of semiconductor diodes. 7.2. The switching regime of bipolar transistors. 7.3. The switching regime of unipolar switching transistors. 8. Other semiconductor junction devices. 8.1. PNPN semiconductor structures (PNPN diode, conventional SCR, Diac triac). 8.2. TUJ site. TUP site. 9. The Electronic noise. 9.1. The nature of electronic noise. 9.2. The noise of the semiconductor devices. 10. Basic amplification stages. 10.1. Small signal amplifiers. 10.2. Modeling the noise of small signal amplifiers. 10.3. Signal distortion in small signal amplifiers. 10.4. Study of some amplifier stages. 10.5. Joining stages. 10.6. The amplifier treated as a CUADRIPOL.
Tutorial: 1. P-n junction. Diodes. Diode circuits. 2. Polarization of bipolar transistor circuits. 3. TB small signal modeling. 4. Field effect transistors: JFET and MOS. 5. Basic amplification stages with TB and TU. 6. Other semiconductor junction devices.
Laboratory: 1. Presentation of laboratory equipment and safety briefing. 2 Semiconductor diodes. Diode circuits. 3. TB static characteristics. The P.s.f. stabilization of TB.
4. Determining the natural model elements and the TB reaction at high frequencies . Amplification stages with TB. 5. Field effect transistors. Reaction in static regime. 6. Field effect transistors. Dynamic regime. 7. Other semiconductor junction devices. Applications 8. Switching elementary semiconductor devices. 9.Recoveries. 10. Testing knowledge
TEACHING LANGUAGE - Romanian
EVALUATION: written examination
BIBLIOGRAPHY:
Doicaru, E., Dispozitive electronice, Editura Universitaria, Craiova, 2002;
Dascălu, D. ş.a. Dispozitive şi circuite electronice, Ed. didactică şi pedagogică, Bucureşti. 1982;
Dănilă, Th. ş.a., Dispozitive şi circuite electronice, Ed. didactică şi pedagogică, Bucureşti, 1982;

SUBJECT: SIGNALS

NUMBER OF CREDITS: 6
SEMESTER: I
COURSE TYPE: field related
COURSE OBJECTIVES: The course aims at introducing the core concepts related to specific signals and systems, signal types, types of systems and solving equations of linear systems in alternative time. Knowledge about the development of continuous and discrete signals of Fourier series and Fourier transforms.
COURSE CONTENT: 1. Introduction. Signals and Systems. Mathematical models. Basic definitions. Mathematical models. Basic operation of the signals. The characteristics of the signals. Representation and systems characteristics. 2. Time representation of continuous systems. Sinusoidal and exponential signals. Single function type signals. The energy and power of a signal. Representing signals by generalized Fourier series. 3. Analysis of the continuous-time system. The solution of the equations system. Impulse response systems. Zero state response. 4 The representation of the frequency signal. Spectrum and bandwidth for continuous-time signals. Fourier representation of signals. The amplitude and phase of periodic signals. Fourier transform of different signals. 5.Frequency analysis of continuous systems. Frequency response systems. Frequency response in electronic circuits. Group and phase delay. Amplitude and phase Bode diagrams.
Tutorial:1. Characteristics and models of two signals.2. Representation of continuous-time signals 3. Time analysis of signals and systems 4.Analysis in frequency signals 5. The development of the Fourier series . Development of Fourier transform signals 7. The representation of the systems in block diagram form.
Laboratory:1. Graphics MATLAB files to represent two signals. 2. Creating m 3 files. Applications in MATLAB with signal analysis specific functions 4. Studying time response with MATLAB 5. Study of frequency response with MATLAB 6. Recovery sessions in 7. Final laboratory colloquium
TEACHING LANGUAGE: Romanian
EVALUATION: written examination
BIBLIOGRAPHY:
M. I. Mihaiu, "Signals and Systems", Universitaria Publishing House, Craiova, 2007
Gordon E. Carlson, "Signal and Linear System Analysis", John Wiley & Sons, New York, 1998
Allan Oppenheim, Allan Willsky, "Signals and Systems", Prentice Hall, Englewood Cliffs, New Jersey, 1983
ISGonorovsky, "Radio Circuits and Signals", MIR, Moscow, 1981
Gh Cartianu, etc., "Signals, Circuits and Systems", Didactic and Pedagogic Publishing, Bucharest, 1980

Adelaida Mateescu, N. Dumitru, "Signals and telecommunication circuits", Didactic and Pedagogic Publishing, Bucharest, 1979
M. Săvescu its Signals, Circuits and Systems-Issues "Didactic and Pedagogic Publishing House, Bucharest, 1981

SUBJECT: SYSTEMS THEORY

NUMBER OF CREDITS: 5
SEMESTER: I
TYPE OF COURSE: core

Objective: To establish mathematical models for physical objects; properties analysis of dynamic systems, frequency and stability characteristics Defining performance and quality indicators for automatic regulatation systems, designing regulators in conventional control systems meshing systems, numerical regulation systems.

COURSE CONTENT: Chapter 1. Basic concepts of automatic systems. 1.1 Oriented systems, examples; 1.2. The state concept Chapter 2. Linear time-invariant systems. 2.1 The transfer function; Graphical representation of the systems; 2.2. The connection of the systems; Equivalent reductions; 2.3. State equations; 2.4. Controlling and observing systems; 2.5. Frequency characteristics;
2.6. The stability of the systems; Chapter 3. The general structure of an automatic adjustment system; 3.1. The general structure of a conventional regulation system;
3.2. Classification of controllers and regulation systems; Chapter 4. Algorithms and standardized elements for automatic adjustment 4.1. The PI element (proportional), 4.2. The I element (integrator), 4.3. The PI element (proportional - integrator) 4.4. The PD element (proportional-derivative), 4.5. The PID element (proportional-integrator-derivative) Chapter 5. Quality and performance indicators imposed on regulation systems 5.1. Quality indicators that measure the accuracy of the adjustment; 5.2. Stationary position error caused by a step variation in a disturbance; 5.3. Indicators of quality and performance in harmonic regime; 5.4. Indicators of quality and performance in transitory regime. Chapter 6. Down-time systems. 6.1 Examples of down-time systems 6.2. The influence of the down-time on the performance of regulation system Chapter 7. Regulation structures 7.1. Combined regulation systems 7.2. Cascade regulation systems; 7.3. Regulation systems with bi-positional regulators; 7.4. Regulation sytems with tri-positional regulators Chapter.8. The calculus of discrete regulation systems, 8.1. Discrete-time systems. Sampling systems; 8.2. Computer process architecture process;
8.3. Direct and inverse Z transformation; 8.4. Numerical regulation algorithms obtained by means of standardized algorithms meshing 8.5. Numerical algorithms parametrically optimized

Tutorial:1. Laplace transformation; Practical exmples. 2. Solving differential equations using Laplace transformation 3. Examples of establishing mathematical models 4. Reducing systems using block diagrams 5. The study of systems controllability and observability 6. Establishing frequency characteristics 7. The calculus for the response of the systems at type signals 8. Stability analysis of the systems
9. Calculus of the regulation systems performance 10. Direct and inverse Z transformation 11. Designing regulation numerical algorithms

TEACHING LANGUAGE - Romanian
EVALUATION: written examination
BIBLIOGRAPHY:

Belea c., Teoria sistemelor automate, Reprografia Universității din Craiova, YoU, 1971; Vo1.2, 1974.
Dumitrache 1. și alţii, Automatizări electronice, Editura Didactică și Pedagogică, București, 1993.
Ionescu V., Teoria sistemelor - Sisteme liniare, Editura Didactică și Pedagogică, București, 1985.
Marin C., Popescu D., Petre E., Ionete C., Selișteanu D., Teoria sistemelor, Ed. Universitaria, Craiova, 2004.
Marin C., Sisteme discrete în timp, Ed. Universitaria Craiova, 2005.
Marin C., Popescu D., Teoria sistemelor și reglare automată, Editura Sitech, Craiova, 2007.
Marin C., Petre E., Popescu D., Ionete C., Selișteanu D., Teoria sistemelor-Probleme, Editura Sitech, Craiova (Ediția a patra), 2005.

SUBJECT: OBJECT ORIENTED PROGRAMMING

NMBER OF CREDITS: 4
SEMESTER: I
COURSE TYPE: field related

COURSE OBJECTIVES: Teaching the students and making them understand the basic knowledge related to concepts and methods of object-oriented programming paradigm. Aquiring the proper skills for the students to be able to use the C + + as the first object-oriented programming language. Developing the students' abilities to create applications of small and medium complexity using the Visual C + + programming.

COURSE CONTENT: A. Introductory elements about Object-Oriented Programming Chapter 1. Programming paradigms Chapter 2. Extensions of C programming language in C + + Chapter 3. Definition and usage of the classes Chapter 4. Constructors and destructors Chapter 5. Names space
B. Basic concepts about Object-Oriented Programming
Chapter 6. Composing objects Chapter 7. Class hierarchies Chapter 8. Nested classes. Friend functions and classes
Chapter 9. Overloading the operators C. Advanced principles of object-oriented programming Chapter 10. Polymorphism and virtual functions Chapter 11. Parameterized classes and functions. The template mechanism Chapter 12. Handling exceptions D. Standard libraries of C + + programming language Chapter 13. Class hierarchy for input / output operations Chap14. Generic programming elements. STL Library **Laboratory:** 1. Extensions of the C programming language in C + + 2. Definitions and usage of the classes 3. Constructors and destructors 4. Space names. 5. Composing objects 6. Class hierarchies 7. Overloading the operators 8. Windows programmes. Simple MFC Applications 9. MFC applications based on dialog boxes 10. MFC SDI and MDI Applications 11. Polymorphism and virtual functions 12. Template functions and classes.

TEACHING LANGUAGE - Romanian
EVALUATION: written examination
BIBLIOGRAPHY:

Thinking în C++, Bruce Eckel, Prentice Hall, 2000 (electronic free) The C++ Programming Language, Bjarne Stroustrup, Addison-Wesley, 1997 Effective C++, Scott Meyers, Addison-Wesley, 1996 C++ Primer, Stanley Lippman, Josee Lajoie, AddisonWesley, 1998 5. Andrei Alexandrescu, Programarea modernă în C++, Programare generică și modele de proiectare aplicate, Teora, 2002.

SUBJECT : OBJECT-ORIENTED PROGRAMMING-PROJECT

NUMBER OF CREDITS 1
SEMESTER: I
COURSE TYPE: field related

COURSE OBJECTIVES: : Teaching the students and making them understand the basic knowledge related to concepts and methods of object-oriented programming paradigm. Teaching students to use C + + as the first object-oriented programming language. Developing students' abilities to create small and medium complexity applications using the Visual C + + programming.
Contents: 1. The project must use object oriented programming concepts. 2. The project should have a usage manual, and the code should contain comments. 3. Stundents should hand in the UML diagram for the developed application – the deadline for submission is T0 + 5 weeks where T0 is the date when the theme of the project has been received. 4. Students should use all the benefits of the Windows operating system in their projects
TEACHING LANGUAGE: Romanin
EVALUATION: Project
BIBLIOGRAPHY:
Thinking în C++, Bruce Eckel, Prentice Hall, 2000 (electronic free)
The C++ Programming Language, Bjarne Stroustrup, Addison-Wesley, 1997
Effective C++, Scott Meyers, Addison-Wesley, 1996
C++ Primer, Stanley Lippman, Josee Lajoie, Addison-Wesley, 1998 5. Andrei Alexandrescu, Programarea modernă în C++, Programare generică și modele de proiectare aplicate, Teora, 2002.

SUBJECT: ELECTRONIC TECHNOLOGY

NUMBER OF CREDITS: 3
SEMESTER: I
COURSE TYPE: field related
COURSE OBJECTIVES: The course aims at introducing the basic concepts of: number systems, switching algebra, MSI and LSI integrated circuits, flip-flops, counters and registers, analysis and synthesis of synchronous and asynchronous sequential circuits.
COURSE CONTENT: 1. Numbering Systems. 1.1. Transformations. 1.2. Binary encoding of decimal numbers. 2. Binary Arithmetics. 3. Geometric representation of binary numbers. 3.1. Error detection codes. 3.2. Self-detection codes. 4. Switching Algebra. 4.1. Introduction. 4.2. Switching algebra postulates. 4.3. Switching algebra theorems. 5. Analysis and synthesis of switching functions. 5.1. Minimal analysis of commutation functions. 5.2. Synthesis of switching functions. 6. Special properties of switching functions. The hazard of switching circuit 7. Families of integrated circuits. 7.1. Bipolar families (TTL, ECL, I2L). 7.2. MOS CMOS families. 8. MSI integrated circuits. 8.1. Decoders. 8.2. Demultiplexer. 8.3. Multiplexers 9. LSI integrated circuits. 9.1. PAL circuits. 9.2. PLA circuits. 10. Integrated bistable circuits. 10.1. Properties. 10.2. The logical function. **1**0.3. The behavior over time. 11. Counter. 11.1. Design of synchronous counters. 11.2. Designing asynchronous counters. 12. Series and parallel registers. 13. Analysis of synchronous sequential circuits. 14. Synthesis of synchronous sequential circuits with D and JK flip-flops.
Laboratory: Numbering Systems. Codes. Arithmetic operations Minimization of Boolean functions with K-V diagrams. Composition and decomposition of Boolean functions. Encoding and decoding. Synthesis of synchronous sequential circuits using JK bistables . Synthesis of circuits using logic AND, OR, NOT gates on the WEWBD simulator.
Synthesis of logic circuits using NAND, NOR gates on the WEWBD simulator.
Designing MUX 4:1 multiplexers on the WEWBD simulator.
Designing the synchronous counters using JK and D flip-flops on the WEWBD simulator. Designing asynchronous counters using D and JK flip-flops on the WEWBD simulator.
Analysis of synchronous sequential circuits using D bistables.
Synthesis of synchronous sequential circuits using D and JK flip-flops.
TEACHING LANGUAGE: Romanian
EVALUATION Colloquim
BIBLIOGRAPHY:
Blakeslee, Th., Proiectarea cu circuite logice MSI şi LSI standard, Ed. Tehnică, Bucureşti, 1988.
Huţanu, C., Circuite logice şi comenzi secvenţiale, Ed. Junimea, Iaşi, 1983.
Maican, S., Sisteme numerice cu circuite integrate, Culegere de probleme, Ed. Tehnică, Bucureşti 1980

SUBJECT : FUNDAMENTAL ELECTRONIC CIRCUITS

NUMBER OF CREDIT POINTS: 4
SEMESTER: II
COURSE TYPE: specialty
COURSE OBJECTIVES: The course presents the concepts needed to understand the operation, analysis and use of hybrid and monolithic amplifiers, rectifiers, voltage stabilizers and harmonic oscillators. The Tutorial is designed to secure the knowledge and to create account skills by means of practical applications, exercises and problems. The project aims to create skills to design circuits covered in the course.
CONTENT: 1. Small signal amplifiers. 1.1. Cascode floors. 1.2. Floors with high input impedance. 1.3. Selective amplifiers. 2. Reaction in amplifiers. 2.1. General properties of the reaction. 2.2. Types of negative reaction. 2.3. Feedback circuit topology analysis. Application examples of the theory. 3. Operational Amplifiers (OA). 3.1. General notions. Operational amplifiers parameters. 3.2. OA elementary circuits. 3.3. V-I, I-V converters 4. Operational transconductance amplifiers (OTA). 4.1. General notions. OTA parameters. 4.2. Scheme of typical use. 5. Norton amplifiers (NA). Negative feedback current amplifiers (CFOA). 5.1. General notions. NA parameters. 5.2. Typical schemes of NA applications. 5.3. General notions. CFOA parameters. 5.4. Typical scheme of CFOA applications. 6. Rectifiers. 6.1. Single phase half-wave rectifier.
6.2. Bi-phase alternating rectifier. 6.3. Thyristor controlled rectifiers. 6.4. Multiplying voltage rectifiers. 7. Voltage stabilizers. 7.1. General notions. Voltage stabilizers parameters. 7.2. Stabilizer actuator bypass. Stabilizer actuator series. 7.3. Types of items. Protective circuits of stabilizers. 7.4. Monolithic regulators general purpose. 7.5. Monolithic three-terminal regulators. 8. Harmonic oscillators. 8.1. General. Analysis methods of oscillators operation. 8.2. Limiting amplitude of oscillation. 8.3. WIEN bridge oscillators. 8.4. Double T network oscillators. 8.5. Oscillators in "three points" with TB and TU. 8.6. Quartz crystal oscillators.
Laboratory: 1. Small signal amplifiers with composite floors. 2. Feedback amplifiers. 3. Operational amplifiers. 4. Rectifiers. 5. Voltage stabilizers. 6. Harmonic oscillators
TEACHING LANGUAGE: Romanian
EVALUATION: written examination
BIBLIOGRAPHY:
Doicaru, E., Dispozitive electronice, Editura Universitaria, Craiova, 2002.
Dascalu, D. ş.a., Dispozitive și circuite electronice, Editura didactică și pedagogică, București. 1982.
Dascalu, D. ş.a., Circuite electronice, Editura didactică și pedagogică, București. 1981.

Danilă, Th. ş.a., Dispozitive și circuite electronice, Editura didactică și pedagogică, București, 1982.
Doicaru E. ş.a., Dispozitive electronice. Lucrări practice, Editura Universitaria, Craiova, 2005

SUBJECT : FUNDAMENTAL ELECTRONIC CIRCUITS - Project

NUMBER OF CREDIT POINTS: 1
SEMESTER: II
COURSE TYPE: specialty
COURSE OBJECTIVES: The course presents the concepts needed to understand the operation, analysis and use of hybrid and monolithic amplifiers, rectifiers, voltage stabilizers and harmonic oscillators. The Tutorial is designed to improve the knowledge and to develop account skills by means of practical applications, exercises and problems. The project aims to develop skills in circuits design provided by the course.
COURSE CONTENT: 1. Small signal amplifiers. 1.1. Cascode floors. 1.2. Floors with high input impedance. 1.3. Selective amplifiers. 2. Reaction in amplifiers. 2.1. General properties of the reaction. 2.2. Types of negative reaction. 2.3. Feedback circuit topology analysis. Application examples of the theory.
3. Operational Amplifiers (OA). 3.1. General notions. Operational amplifiers parameters. 3.2. OA elementary circuits. 3.3. V-I, I-V converters 4. Operational transconductance amplifiers (OTA). 4.1. General notions. OTA parameters. 4.2. Scheme of typical use. 5. Norton amplifiers (NA). Negative feedback current amplifiers (CFOA). 5.1. General notions. NA parameters. 5.2. Typical schemes of NA applications. 5.3. General notions. CFOA parameters. 5.4. Typical scheme of CFOA applications. 6. Rectifiers. 6.1. Single phase half-wave rectifier.
6.2. Bi-phase alternating rectifier. 6.3. Thyristor controlled rectifiers. 6.4. Multiplying voltage rectifiers. 7. Voltage stabilizers. 7.1. General notions. Voltage stabilizers parameters. 7.2. Stabilizer actuator bypass. Stabilizer actuator series. 7.3. Types of items. Protective circuits of stabilizers. 7.4. Monolithic regulators general purpose. 7.5. Monolithic three-terminal regulators. 8. Harmonic oscillators. 8.1. General. Analysis methods of oscillators operation. 8.2. Limiting amplitude of oscillation. 8.3. WIEN bridge oscillators. 8.4. Double T network oscillators. 8.5. Oscillators in "three points" with TB and TU. 8.6. Quartz crystal oscillators.
Laboratory: 1. Small signal amplifiers with composite floors. 2. Feedback amplifiers. 3. Operational amplifiers. 4. Rectifiers. 5. Voltage stabilizers. 6. Harmonic oscillators
TEACHING LANGUAGE: Romanian
EVALUATION: project
BIBLIOGRAPHY:
Doicaru, E., Dispozitive electronice, Editura Universitaria, Craiova, 2002.
Dascalu, D. ş.a., Dispozitive și circuite electronice, Editura didactică și pedagogică, București. 1982.
Dascalu, D. ş.a., Circuite electronice, Editura didactică și pedagogică, București. 1981.
Danilă, Th. ş.a., Dispozitive și circuite electronice, Editura didactică și pedagogică, București, 1982.
Doicaru E. ş.a., Dispozitive electronice. Lucrări practice, Editura Universitaria, Craiova, 2005

SUBJECT: FUNDAMENTAL ELECTRONIC CIRCUITS - Laboratory

NUMBER OF CREDIT POINTS: 1
SEMESTER: II
COURSE TYPE: specialty
COURSE OBJECTIVES: The course presents the concepts needed to understand the operation, analysis and use of hybrid and monolithic amplifiers, rectifiers, voltage stabilizers and harmonic oscillators. The Tutorial is designed to secure the knowledge and to create account skills by means of practical applications, exercises and problems. The project to develop skills in circuits design provided by the course.
COURSE CONTENT: 1. Small signal amplifiers. 1.1. Cascode floors. 1.2. Floors with high input impedance. 1.3. Selective amplifiers. 2. Reaction in amplifiers. 2.1. General properties of the reaction. 2.2. Types of negative reaction. 2.3. Feedback circuit topology analysis. Application examples of the theory.
3. Operational Amplifiers (OA). 3.1. General notions. Operational amplifiers parameters. 3.2. OA elementary circuits. 3.3. V-I, I-V converters 4. Operational transconductance amplifiers (OTA). 4.1. General notions. OTA parameters. 4.2. Scheme of typical use. 5. Norton amplifiers (NA). Negative feedback current amplifiers (CFOA). 5.1. General notions. NA parameters. 5.2. Typical schemes of NA applications. 5.3. General notions. CFOA parameters. 5.4. Typical scheme of CFOA applications. 6. Rectifiers. 6.1. Single phase half-wave rectifier.
6.2. Bi-phase alternating rectifier. 6.3. Thyristor controlled rectifiers. 6.4. Multiplying voltage rectifiers. 7. Voltage stabilizers. 7.1. General notions. Voltage stabilizers parameters. 7.2. Stabilizer actuator bypass. Stabilizer actuator series. 7.3. Types of items. Protective circuits of stabilizers. 7.4. Monolithic regulators general purpose. 7.5. Monolithic three-terminal regulators. 8. Harmonic oscillators. 8.1. General. Analysis methods of oscillators operation. 8.2. Limiting amplitude of oscillation. 8.3. WIEN bridge oscillators. 8.4. Double T network oscillators. 8.5. Oscillators in "three points" with TB and TU. 8.6. Quartz crystal oscillators.
Laboratory: 1. Small signal amplifiers with composite floors. 2. Feedback amplifiers. 3. Operational amplifiers. 4. Rectifiers. 5. Voltage stabilizers. 6. Harmonic oscillators
TEACHING LANGUAGE: Romanian
EVALUATION: ongoing evaluation
BIBLIOGRAPHY:
Doicaru, E., Dispozitive electronice, Editura Universitaria, Craiova, 2002.
Dascalu, D. ş.a., Dispozitive și circuite electronice, Editura didactică și pedagogică, București. 1982.
Dascalu, D. ş.a., Circuite electronice, Editura didactică și pedagogică, București. 1981.
Danilă, Th. ş.a., Dispozitive și circuite electronice, Editura didactică și pedagogică, București, 1982.
Doicaru E. ş.a., Dispozitive electronice. Lucrări practice, Editura Universitaria, Craiova, 2005

SUBJECT: MEASUREMENT IN ELECTRONICS

NUMBER OF CREDIT POINTS: 5
SEMESTER: II
COURSE TYPE: specialty
COURSE OBJECTIVES: Basic skills training on quantitative and qualitative evaluation of specific quantities of electronic circuits. Laboratory objective: training and practical skills for handling electronic measurement instrumentation for specific applications.
COURSE CONTENT: 1. Terms and definitions specific to electrical measurements. Electrical quantities characteristic values. The general form of measurement structures 2. Definition, classification and estimation of measurement accuracy. Distribution law and essential properties of measurement error. Errors assessment in direct measurements isolated and repeated, and indirect

measurements. 3. Electronics specific signal. Periodic signals. Signal parameters. Typical waveforms. Amplitude and frequency modulation signal 4. Currents and voltages measuring. Indicator type tools. Continuous current (DC) measurements. Analog voltmeters and ammeters. Differential tools. Digital voltmeters elements; 5. Measuring currents and alternative voltages. Analog voltmeters and ammeters of alternative current (AC). Frequency band of electronic tools. Alternative current (AC) interference. 6. Viewing and recording the time evolution of electrical quantities. Real time oscilloscope. The functional principle and modes of use; 7. Oscilloscope use to measure some parameters of components and electronic circuits. 8. Study the frequency response of electronic circuits. Determination of the amplitude and phase characteristics 9. Measurement methods and structures for evaluation of circuit parameters. Resistance measurement. Indicator type tools. General characteristics of electronic ohmmeter and megohmmeter. Balance structures measuring. General characteristics of the Wheatstone bridge 10. Low resistance measurement. Kelvin bridge. High resistance measurement. Screening bridges 11. Measuring Chapacitors and coils. Equalization scheme of circuit elements parameters. Alternative current (AC) bridges. Bridges for measuring Chapacitors. Bridges for measuring inductances. Schematic diagram and equilibrium relations 12. Measuring time and frequency methods. Measuring phase shifts 13. Parameters measurement of power supply and signal generators for testing electronic circuits 14. High frequency measurements

Laboratory:

1. Presentation of the laboratory topics, works and specific laboratory safety rules 2. Study of instrumentation for measuring voltage and current 3. Comparative measurement of voltage and current 4. Oscilloscope study; 5. Measurement of signal oscilloscope parameters 6. Raising the frequency characteristics oscilloscope 7. Intermediate test 8. Dynamic characteristics view of electronic devices 9. Instrumentation study for measuring the circuit parameters; 10. Resistance measurement with analog and digital ohmmeters 11. Resistance measurement with continuous current (DC) bridge 12. Chapacity and inductance measurement with alternative current (AC) bridge 13. Internal resistance measurement of signal sources 14. Practical knowledge test.

TEACHING LANGUAGE: Romanian

EVALUATION: written examination

BIBLIOGRAPHY:

Antoniu, M., “Măsurări electronice (2 volume)”, Editura SATYA, Iaşi, 2001, ISBN 973-98708-7-2;

Bakshi, U.A., Bakshi, A.V. “Electronic Measurements and Instrumentation”, Technical Publications, Pune,2008, ISBN 9788184310740;

Scherz, P., “Practical Electronics for Inventors”, McGraw-Hill, 2006, ISBN 0071452818;

Smith, D.C., “High Frequency Measurements and Noise în Electronic Circuits”, Springer, 1993, ISBN 0442006365;

Şerban, T., „Măsurări în electronică”, note de curs, Craiova, 2008.

SUBJECT: INFORMATION TRANSMISSION AND CODING

NUMBER OF CREDIT POINTS: 4

SEMESTER: II

COURSE TYPE: specialty

COURSE OBJECTIVES: Contribute to the development of future electronics engineers, providing them knowledge in the theory of information transmission. They deal with basic concepts used in the design and implementation of data transmission systems. The laboratory is designed to secure the knowledge and understanding of phenomena to enable practical applications.

COURSE CONTENT: Chap. 1. Introduction to the information transmission theory. 1.1 The place and role of information transmission systems 1.2 General characterization of teleinformatic systems. 1.3 The concept of information. The information in the discrete case. 1.5 Entropy. General concepts. Properties Chap. 2. Communication channels, 2.1 Channel types. General Classification. 2.2 The mathematical model of a transmission line with distributed parameters. 2.3 The signal attenuation on the transmission line. The quality of the transmission. 2.4 Multichannel systems: Chap. 3. Digital information transmission 3.1 Amplitude discrete modulation (ASK) 3.1.1 Coherence ASK demodulators. 3.1.2 Incoherent ASK demodulators. 3.2 Frequency discrete modulation (FSK). 3.2.1 Coherent FSK demodulators. 3.2.2 Incoherent FSK demodulators. 3.3 Phase discrete modulation (PSK) 3.3.1 Coherent PSK demodulators. 3.4 Impulse modulation. 3.4.1 Modulation impulse amplitude (MIA). Demodulation MIA. 3.4.2 Modulation impulse frequency (MIF). Demodulation MIF. 3.4.3 Modulation impulse interval (MII). Demodulation MII. 3.4.4 Modulation impulse duration (MID). Demodulation MID. 3.4.5 Modulation impulse position (MIP). Demodulation MIP. 3.4.6 Modulation impulse code (MCI). 3.5 Delta modulation (MD). 3.5.1 Linear delta modulation (MDL). 3.5.2 MDL behavior at zero signal. Overcoming the slope. 3.5.3 MD delta-sigma type. 3.5.4 MD exponential. 3.5.5 MD HIDM type. 3.6 Synchronization and multiplexing of digital transmission systems. 3.6.1 Cyclical timing methods. 3.6.2 Formation of code groups. 3.6.3 The average time of the two outputs of synchronism. 3.6.4 Multiplexing of digital signals by interleaving bits. 3.6.5 Multiplexing of digital signals by interlacing code words. Chap. 4. Baseband transmissions. 4.1 Interference intersimbol. Nyquist's theorem. 4.2 Equalized signal. 4.3 Signals used for baseband transmission. Chap. 5. Error control in data transmissions. 5.1 Definition of error detection and correction codes. 5.2 Parameters of error detection and correction codes. 5.3 Transfers parity control. 5.4 Hamming distance. Using the Hamming distance to detect and correct errors 5.5 Linear codes. Hamming type codes. 5.6 Cyclic codes. 5.7 Convolutional (recurring) codes. 5.8 Organisation of teleinformatic systems to avoid errors Chap. 6. Data compression. 6.1 Introduction to data compression. Basics notions. 6.2 Compression techniques. 6.2.1 Data compression by null suppression. 6.2.2 Mapping message (bit mapping) method. 6.2.3 Diatonic coding method. 6.2.4 "Run length" method. 6.2.5 "Half-byte packing" method 6.2.6 "Pattern substitution" method. 6.2.7 Statistical coding method. 6.2.8 Procedure facsimile. 6.2.9 Data compression using Huffman and Shannon-Fano codes. 6.2.10 Data compression using MDCI. 6.2.11 Data compression in frequency domain. 6.3 Applications of data compression. Chap 7. Encryption information systems. 7.1 Introduction. Terminology. 7.2 Encryption with random keys. 7.3 Encryption with pseudo-random keys. 7.4 Public key encryption

Tutorial: 1. The mathematical model of a transmission line with distributed parameters. 2. Reflection of signal propagation lines. Analytical and graphical methods for determining the reflected wave. 3. Spectral analysis of the signals. 4. Channel separation frequency. 5. Design signal equalizers. 6. The design of a Hamming code.

Laboratory:

1. Simulation of the signal propagation in a transmission line. 2. Time separation channel (layout). 3. Spectral analysis of

the signals. (computer simulation). 4. Amplitude modulation signals (ASK). ASK interfering signal with an appropriated carrier frequency (+ computer simulation model). 5. Frequency modulation signal (FSK). Interference FSK signal with an appropriated carrier frequency (+ computer simulation model). 6. Phase modulation signals (PSK). PSK signal interference with an appropriated carrier frequency. Computer simulation. 7. Delta modulation (model + computer simulation).

TEACHING LANGUAGE: Romanian

EVALUATION: written examination

BIBLIOGRAPHY:

Carbon M., Exercices résolus de mathématiques du signal, Ed. Dunod Paris 1992

Cullman G., Coduri detectoare și corectoare de erori, Ed. Tehnică București 1972

Dobrescu R., Transmiterea datelor, Editura Academiei Române, București, 2005

Duvant P., Traitement du signal, Ed. Hermes - 1990

Feher K., Comunicaţii digitale avansate, vol. I, Ed. Tehnică București 1993

Feher K., Comunicaţii digitale avansate, vol. II, Ed. Tehnică București 1994

Held G., Data Compression. Techniques and Applications. Hardware and software, Ed. John Wiley&Sons1985

Held G., Comunicaţii de date, Editura Teora, Bucureşti, 1998.

Iancu E., Teoria transmisiei datelor, Editura Universitaria, Craiova, 2004.

Iancu E., Transmisii de date , îndrumar de laborator 1995, Reprografia Universităţii din Craiova

Proakis J., Communication Systems Engineering, Prentice Hall International Editions, 1994.

Reinhard H., Cours de mathématiques du signal, Ed. Dunod Paris - 1992

Spătaru Al., Fondements de la théorie de la transmission de l'information, Presses Polytechniques Romandes, 1987

Tugal D., Data Transmission. Analysis, Design, Application consideration , McGraw-Hill Book Company 1982

SUBJECT: CAD DESIGN TECHNIQUES IN ELECTRONIC CIRCUITS

NUMBER OF CREDIT POINTS: 4

SEMESTER: II

COURSE TYPE: specialty

COURSE OBJECTIVES: The course aims to familiarize students with methods and techniques used in the analysis and design of electronic modules using a computer and acquiring the most used simulation program in electronic circuits functioning - SPICE.

COURSE CONTENT: 1. General concepts. 1.1. Definitions - circuits and systems, analysis, synthesis and design, CAD and EDA. 1.2. Computational aspects of circuits and systems design. 2. Fundamentals of analog circuit theory. 2.1. General concepts. 2.2. Analog circuits primitives and their models. 2.3. Analog circuits analysis. 3. Computer aided design of analog circuits. 3.1. General concepts. 3.2. Synthesis circuits. 3.3. Simulation and adjustment circuits. 3.4. Layout circuit generation. 3.5. Extraction and verification. 3.6. Manufacturing and testing. 3.7. Classification of automatically synthesis methods of analog circuits. 4. SPICE simulator. 4.1. Description of the circuit and semiconductor devices. 4.2. Circuit analysis: continuous current (DC) , alternative current (AC), time domain analysis, analysis of distortion. 4.3. Functional and hierarchical simulation. 4.4. SPICE algorithms and options. 4.5. Convergence problems.

Laboratory:

1. SPICE program presentation. 2. Continuous current (DC) analysis of elementary and composite floors amplification. 3. Alternative current (AC) analysis of elementary and composite floors amplification. 4. Time domain analysis of RLC circuits, oscillators, basic logic circuits. 5. Functional and hierarchical simulation: operational amplifier, voltage controlled oscillator. 6. Amplifier design using SPICE. 7. Recoveries. 8. Knowledge verification.

TEACHING LANGUAGE: Romanian

EVALUATION: written examination

BIBLIOGRAPHY:

R. A. Rutenbar, G. G. Gielen, B. A. Antao, Computer-Aided Design of Analog Integrated Circuits and
Systems, Wiley-IEEE Press, 2002.

T. R. Padmanabhan, B. T. Sundari, Design Through Verilog HDL, Wiley-IEEE Press, 2003.

J. Vlach, K. Singhal: Computer Methods for Circuits Analysis and design, Renhold, New York, 1983.

R. L. Geiger, P. E. Allen, N. R. Strader, VLSI Design Techniques for analog and digital circuits, McGraw- Hill, New York, 1990.

Andrei Vladimirescu,SPICE, Ed. Tehnică, București, 1994.

SPICE – User's Guide.

SUBJECT: ACCOUNTING ELEMENTS

NUMBER OF CREDIT POINTS: 2

SEMESTER: II

COURSE TYPE: complementary

COURSE OBJECTIVES: Provide students a basic knowledge in accounting, knowledge and understanding of processes specific to accounting method; Understanding financial accounting terminology, Formation of logical thinking in terms of accounting language transposition of the main economic and financial operations generated by economic activity, Understanding the methodology and techniques of accounting specific work

COURSE CONTENT: Chap. 1 Accounting subject method; 1.1. Accounting subject; 1.2. Accounting method. Chap. 2 Heritage accounting representation and financial results; 2.1. The concept and structure of the balance sheet; 2.2. Presentation of balance sheet structures of heritage content; 2.3. Balance changes appropriate to economic changes; 2.4. Account structure of financial results. Chap. 3 Assessment accounting of property structures; 3.1. General rules for evaluation 3.2. Prices and rates used in the accounting evaluation. Chapter 4 Supporting documents and records; 4.1. Define accounting documents; 4.2. Supporting documents, ledgers, 4.3. The accounting and reporting summary, 4.4. Document management. Chap. 5 Accounting and double-entry account; 5.1.Account necessity and defining 5.2. Characteristic elements of account structure; 5.3. Account functioning rules; 5.4. Double registration and mail accounts; 5.5. Accounting analysis of economic operations; 5.6. Formula and article accounting sheet; 5.7. Classification of accounts and the relationship between synthetic and analytical accounts. Chap. 6 Inventories; 6.1. The use and classification of inventories; 6.2. General organization of the heritage inventory, 6.3. Setting and solving inventory results. Chap. 7 Trial balance; 7.1. Concept, importance and functions of trial balance; 7.2. Classification of trial balances; 7.3. Identification of the recording error checking balances. Chap. 8 The annual financial statements. 8.1. General elements of the annual financial statements; 8.2. The structure of the financial statements.

TEACHING LANGUAGE: Romanian

EVALUATION: colloquium

BIBLIOGRAPHY:

Goagara Daniel – Bazele contabilităţii moderne, Editura Universitaria, Craiova, 2009.
Drăgan Cristian, Brabete Valeriu – Bazele contabilităţii, Editura Universitaria, Craiova, 2006.
Staicu Constantin – Bazele contabilităţii moderne, vol.1, Editura Scrisul Românesc, Craiova, 2003.
Staicu Constantin (coordonator) – Bazele contabilităţii moderne, vol.2, Editura Universitaria Craiova, 2004.
Sandu Maria (coordonator) – Bazele contabilităţii, Editura Scrisul Românesc, Craiova, 2005.
Calin Oprea, Ristea Mihai – Bazele contabilităţii, Editura National, Bucureşti, 2001.
Epuran M., Babaita V. - Teoria generală a contabilităţii, Editia a II-a, Editura Mitron, 2002

SUBJECT: ANALYSIS AND SYNTHESIS OF ANALOG CIRCUITS

NUMBER OF CREDIT POINTS: 4
SEMESTER: II
COURSE TYPE: specialty
COURSE OBJECTIVES: The course aims to introduce the fundamental concepts related to analysis and design of electronic filters namely common types of passive filters, sensitivity filters, approximation methods filters, active filters of various types and Chapacities switched filters. In the laboratory classes are studying passive and active RC filters, Butterworh 2nd order filters and software to design active filters.
COURSE CONTENT: 1. General characterization of the filters. Time and frequency response. Ideal and real filters. Amplitude and phase distortion. Minimum and non minimun filters phase. All pass filters. 2. Filter approximation methods. Butterworth approximations, Cebâşev, Bessel-Thomson and elliptical. 3. Frequency transformations. Lowpass filter prototype (LPP). Frequency and impedance scaling. LPF LPF, LPF and LPF-FTB-FTS transformations. 4. Sensitivity and selectivity filter. Definition of sensitivity, sensitivity coefficients, root sensitivity. Multiparameter measurement sensitivity and sensitivity. 5. Active filters with reduced gain amplifiers. FDT of 1^{st} and 2^{nd} order . Achieving 1^{st} and 2^{nd} order FDT . 2^{nd} order biquadratic filters. Higher order filters. 6. Filters with multiple reaction on a single amplifier (MFB). The general structure of a single amplifier filters. MFB structure with pole only. MFB filter design with pole only. Structures with modified side for MFB. Structure of 2^{nd} order MFB. 7. 2^{nd} order filters with multiple amplifiers. 2^{nd} order filters with decoupled time constants. 2^{nd} order filters with T type network. Filters general impedance converter (GIC) 8. 2^{nd} order filters with general power converters imitator type. 2nd order structure Antoniou type. CGIC filter stability. Techniques for designing and adjusting the CGIC filter cutoff frequency. 9. Higher order filters. Active filters connected in cascade. Making multiple response filters.
Tutorial:
1. Bode diagrams for electronic circuits 2. Design of active filters of .....order 3. Design of active filters of .....order 4.Higher order Sallen-Key filter design 5. Higher order MFB filter design 6. The choice of circuit elements for designing active filters 7. Active filter design with specialized software

Laboratory:
1. RC passive filters low pass and high pass 2. RC active filters low pass and high pass 3. Butterworth 2nd order filters TJ, TS and TB 4. Active filters study with FilterLab2 program 5. Active filters study with FCAD program 6. Analysis of active filters in AFD program or MATLAB 7. Recoveries and final colloquium laboratory.
TEACHING LANGUAGE: Romanian
EVALUATION: written examination
BIBLIOGRAPHY:

Dorf. R. Richard (editor), "The Circuits and Filters Handbook", CRC Press 2002. Sunt puse pe Internet la adresa www.electronics.ucv.ro/mihaium 4 Chapitole din manualul de mai sus traduse în limba română de către Mihaiu M.
Shaumann R. et others, „Design of Analog Filters", Englewood Cliffs , New York,1990
Antoniou A. "Digital Filters- Analysis, Design and Applications",Mc Graw Hill, 1993
Huelsman L.P., "Active and Passive Filtrer design", ",Mc Graw Hill, 1993.

SUBJECT: INTERNSHIP 1

NUMBER OF CREDIT POINTS: 5
SEMESTER: II
COURSE TYPE: specialty
TEACHING LANGUAGE: Romanian
EVALUATION: colloquium

3- rd Year

SUBJECT: ANALOG INTEGRATED CIRCUITS

NUMBER OF CREDIT POINTS: 6
SEMESTER: I
COURSE TYPE: field related
COURSE OBJECTIVES: The aim is that the students asimilate the knowledge necessary for understanding the operation, design and use of basic constructive steps of the analog integrated circuits, of linear and nonlinear circuits with operational amplifiers and comparators, of multipliers, of monolithic and hybrid signal generators, of switching stabilizers, and also learning how to use the specific instrumentation for determining performance of studied circuits
COURSE CONTENT: 1. Constitutive basic steps of analog integrated circuits. 1.1. Current sources and active loads. 1.2. Sources and voltage references. 1.3. Steps of benefit and acces. 1.4. Steps for the circulation of direct current level. 1.5. Output steps. 1.6. Transline benefit cells. 1.7. Transline multiplier cells. 2. Analysis of monolithic amplifiers. 2.1. Qualitative description of the operation of a typical monolithic amplifiers. 2.2. Dynamic behavior of monolithic amplifiers. 2.3. Monolithic amplifier design considerations. 3. Comparison measurers. 3.1. Generalities and parameters. 3.2. Typical applications. 4. Analog multipliers. 4.1. Generalities and parameters. 4.2. Typical applications. 5. Nonlinear analog circuits. 5.1. Precision rectifiers. 5.2. Peak detectors. 5.3. Logarithmic and exponential amplifiers. 6. Switching voltage regulators. 6.1. Generalities. Parameters of switching voltage stabilizers. 6.2. Types of stabilizers in switching and their analysis. 7. Signal generators. 7.1. Square signal generators. 7.2. Triangular signal generators. 7.3. Sinusoidal signal format. 8. PLL circuits. 8.1. Generalities and parameters. 8.2. Applications. 9. Active filters. 9.1. Active filter with continuous operation in time. 9.2. Active filters with switched Chapabilities.
Tutorial:
1. Internal structures of AO. 2. Nonlinear applications of AO. 3. Function Generators. 4. Active filters. 5. Switching regulators.
Laboratory:
1. Presentation of laboratory equipment and labour protection training. 2. Basic constitutive steps of analog integrated circuits. 3. Integrated power amplifiers. 4. Converters V-I with AO 5. Precision rectifiers. 6. Timers and applications. 7. Function Generators. 8. Active filters. 9. Switching regulators. 10. SPICE simulation of the operation of some basic constitutive levels of analog integrated circuits and of analog integrated circuits and their applications. 11. Recoveries. 12. Verification of knowledge.
TEACHING LANGUAGE: Romanian
EVALUATION: Written examination
BIBLIOGRAPHY:
Doicaru, E., Dispozitive electronice, Editura Universitaria, Craiova, 2002.
Dascălu, D. ş.a., Dispozitive și circuite electronice, Editura didactică și pedagogica, București. 1982.
Dascălu, D. ş.a., Circuite electronice, Editura didactică și pedagogică, București. 1981.
Danilă, Th. ş.a., Dispozitive și circuite electronice, Editura didactică și pedagogică, București, 1982.
Doicaru E.,Dispozitive electronice. Lucrări practice, Editura Universitaria, Craiova, 2005.
Manolescu A., ş.a., Circuite integrate liniare. Editura Didactică și Pedagogică, București, 1981.
Manolescu A., ş.a., Analiza și proiectarea circuitelor integrate analogice VLSI CMOS. Culegere de probleme,Editura Printech, 2006
Johns D., s.a., Analog Integrated Circuit Design, John Wiley & Sons, Inc., 1997.
Gray R., Meyer R., Circuite integrate analogice. Analiza și proiectare, Editura Tehnică, București, 1997.
Manuale de utilizare a pachetelor de programe SPICE.

SUBJECT: DIGITAL INTEGRATED CIRCUITS

NUMBER OF CREDIT POINTS: 5
SEMESTER: I
COURSE TYPE: field related
COURSE OBJECTIVES: The aim is that the students asimilate the knowledge necessary for understanding the functioning of the main types of digital integrated circuits and also the acquisition of methods of analysis and synthesis of combinational and sequential logic circuits. The Tutorial provides the knowledge acquired from the course and develops students' ability to analyze, use and design logic circuits. The laboratory allows the assesment of theoretical knowledge and practical skills regarding the using of digital circuits.
COURSE CONTENT: Chapter 1. The switching regime of the semiconductor devices. 1.1. Semiconductor diode switching regime. 1.2. Bipolar transistor commutation mode. 1.3. Unipolar transistor switching regime. 1.4. Comparison of bipolar transistor and unipolar transistor. 1.5. Electrical representation of logical symbols. Chapter 2. Elementary logic circuits. 2.1. Logic circuits with discrete components. 2.2. Integrated RTL and DTL logic circuits. 2.3. Standard TTL family. Parameters. Inverter, the NAND and NOR of TTL . 2.4. HTTL and TTL Schottky gate. 2.5. Circuits with open-collector. 2.6. "Three State" Circuits. 2.7. ECL and I2L circuits. 2.8. PMOS and NMOS static circuits. 2.9. Transfer gate. Dynamic NMOS circuits. 2.10. CMOS circuits. Inverter, NAND and NOR. 2.11. CMOS transfer gate. Applications Chapter 3. Combinational logic circuits. 3.1. Analysis and c.l.c synthesis. 3.2. Parity detector. 3.3. Multiplexers and demultiplexers. 3.4. Digital comparators. 3.5. Combiners. 3.6. Code converters. 3.7. Encoders and decoders. 3.8. ROM, PROM, EPROM, E2PROM storage. Organization. Extensions. 3.9.Logic programmable areas. Chapter 4. Sequential logic circuits. 4.1. CBB-SR asynchronous, synchronous and Master-Slave. 4.2. CBB-D asynchronous and synchronous. 4.3. Addressable latch. 4.4. RAM storage. 4.5. CBB-D Master-Slave. Registers. 4.6. CBB-T. 4.7. CBB-JK asynchronous, synchronous and Master-Slave. 4.8. Count.
Tutorial:
1. Numbering Systems. Axioms and rules of Boolean algebra calculation. Elementary logic circuits 2/1 2. Synthesis of logic functions. Algebraic Expressions of logic functions 2/2 3. Minimizing Logic functions 2/3 4. The design of resistors external to TTL gates 2/4 5. The study of dynamic system of logic gates 2/5 6. Decoders and demultiplexers 2/6 7. Multiplexers
Laboratory:
1. Presentation of Lab Platform 2. Analysis and c.l.c synthesis. 3. Odness-Parity detector. Code converters. 4. Numerical comparators and adders 5. Multiplexers and demultiplexers 6. Encoders. Address decoders, BCD - decimal and BCD - 7 segments. 7. Bistable circuits: SR, D, T, JK 8. Registers: parallel, of displacement series, universal 9. Static RAM storage: opperation and testing 10. Counters and frequency dividers.

TEACHING LANGUAGE: Romanian
EVALUATION: Written examination
BIBLIOGRAPHY:
Filipescu, V., Circuite electronice digitale, Editura UNIVERSITARIA Craiova, 2002;
Filipescu, V., Circuite integrate digitale – Îndrumar de laborator, Editura UNIVERSITARIA Craiova,
2009;
Maican, S., Sisteme numerice cu circuite integrate - culegere de probleme, Editura TEHNICA, Buc.,
1980;
Millman, J., Grabel, A., Microelectronique, McGraw-Hill, 1991;
Ştefan, Gh., Circuite integrate digitale, Editura DENIX, București, 1993;
Sztojanov, I., ş.a., De la poarta TTL la microprocesor, Seria Electronică aplicată, Editura TEHNICA,
Buc., 1987;
Toacşe, Gh., Nicula, D., Electronică digitală, Editura TEORA, 1996;
Toacşe, Gh., Nicula, D., Electronică digitală. Dispozitive – circuite – proiectare, Editura Tehnică,
București, 2005;
Wakerly, J. F., Circuite digitale. Principiile și practicile folosite în proiectare, Editura Teora, București, 2000.

SUBJECT: ELECTRONIC INSTRUMENTATION OF MEASUREMENT

NUMBER OF CREDIT POINTS: 6
SEMESTER: I
COURSE TYPE: field related
COURSE OBJECTIVES: Course objective: transmitting the Knowledge regarding the structure, operation and use of modern electronic instrumentation for measuring, assessing the performance of current instruments, interconnection and manipulating of elementary modules in modular instruments structures; Tutorial objective: completing the course with detailed studies and practical written examination ples for sizing;
Laboratory objective: practical skills training in the use of modern instrumentation.
COURSE CONTENT: 1. Typical architecture and principles of operation of electronic instruments for measuring electrical and non-electrical quantities 2. Input modules for measuring electrical quantities, written examination ples 3. Input modules for measuring non-electrical quantities, written examination ples 4. Analog-digital conversion in electronic instruments, written examination ples 5. Electronic instrumentation for measuring electrical quantities of intensive type 6. Electronic instrumentation for measuring the circuit parameters, 7. Special features of modern electronic instrumentation: autozero, autocalibration, auto-ranging, functional principles 8. Digital oscilloscope, special functions 9. Spectrum Analyzers 10. Distorsiometres 11. Radio-frequency measuring instruments 12. Electromagnetic compatibility of electronic instruments. Disturbances due to Chapacitive, inductive direct coupling, and to supply system. Reducing interference by using balanced structures. Vigilence on input steps.
Tutorial:
1. Structures of measuring with electronic instruments 2. Input modules for current and voltage 3. Sizing input modules with sensing devices 4. Sizing of some processing and conversion circuits 5. Frequency characteristics of electronic circuits 6. interactive verification of homework
Laboratory:
1. Presentation of laboratory topics and of specific NTSM. 2. The study of programable electronic instrumentation 3. The study of multifunctional portable electronic instrumentation 4. Input modules for measuring systems 5. Measurement system with embedded microcontroller purchaser 6. Multifunctional tool for single phase circuits 7. Industrial measuring instrument with panel meter 8. Phase circuit monitoring system 9. Protection system for power circuits 10. Digital recorder (perturbograf) 11. Study of Numerical oscilloscope: special functions 12. Measurements with the Numerical oscilloscope 13. Testing practical knowledge.
TEACHING LANGUAGE: Romanian
EVALUATION :written examination
BIBLIOGRAPHY:
Bakshi, U.A., Bakshi, A.V. “Electronic Measurements and Instrumentation”, Technical Publications, Pune, 2008, ISBN 9788184310740;

Buchla, D., McLachlan, W., “Applied Electronic Instrumentation and Measurement”, Maxwell Macmillan International Pub. Group, 1992, ISBN 067521162X;
Helfrick, A., Cooper W.D., “Modern Electronic Instrumentation and Measurement Techniques”, Prentice Hall 1990, ISBN 0135932947;
Kalsi, H.S., “Electronic Instrumentation”, Tata McGraw-Hill, 2004, ISBN 0070583706;
O'Dell,T.H., “Circuits for Electronic Instrumentation”, Cambridge University Press, 1991, ISBN 0521404282;
Şerban, T., “Instrumentaţie electronică de măsurare”, note de curs, 2009;
Şerban, T., “Indicaţii pentru aplicaţiile practice”, platforme pentru laborator, 2009;
Wolf, S., Smith R., “Student Reference Manual for Electronic Instrumentation Laboratories”, Prentice Hall, 2004, ISBN 0130421820.

SUBJECT: DIGITAL ACQUISITION OF EXPERIMENTAL DATA

NUMBER OF CREDIT POINTS:4
SEMESTER: I
COURSE TYPE: speciality
COURSE OBJECTIVES: The course presents concepts related to the acquisition of the numerical values of signals (a theoretical foundation, main implementation). The Tutorial allows qualitative analysis of structure conversion and signal acquisition. The laboratory focuses on testing the significant hardware elements from acquisition structures
COURSE CONTENT: Chapter 1. Theoretical basis of numerical acquisition of signal: analog-digital conversion, sampling, algorithmic acquisition, digital acquisition systems architecture. Chapter 2. Data conversion circuits: dependent functional and quality indicators, digital-to-analog converters, analog to digital converters. Chapter 3. Sensors and analog conditioning circuits: classes of sensors, measuring amplifiers, anti-alias filters. Chapter 4. Hardware basics of virtual instrumentation
Laboratory: L1, 2: Study of analog to digital converters by comparison. L3, 4: Study of classical structures of signal conditioning and conversion into numeric values. L5, 6: Study of typical structures associated to conditioning electric transducers. L7: Laboratory Test
TEACHING LANGUAGE: Romanian
EVALUATION: Written examination
BIBLIOGRAPHY:
D. Sheingold, Analog-Digital Convertion Handbook, P. Hall, ‘86.

A. van Putten, Electronic Measurement Systems, Prentice Hall, 1988.
F. Coulon, Théorie et traitement des signaux, P.P. Romandes,´90.
Horst Zander, Datenwandler, Vogel, 1990.
Chester Nachtigal, Instrumentation and Control, J. Wiley, 1990
R. Pallas-Areny, Sensors and Signal Conditioning, J. Wiley, 1991.
R. van der Plassche, Integrated A/D D/A Converters, Kluwer , '94.
J. Proakis, D. Manolakis, Digital Signal Processing, P. Hall, 2005.
S. Tumanski, Principles of Electrical Measurement, Taylor, 2006.
F. Maloberti, Data Converters, Springer, 2007.

SUBJECT: NUMERICAL ACQUISITION OF EXPERIMENTAL DATA - Project

NUMBER OF CREDIT POINTS :1
SEMESTER: I
COURSE TYPE: speciality
COURSE OBJECTIVES: The course presents concepts related to the acquisition of the numerical values of signals (a theoretical foundation, main implementation). The Tutorial allows qualitative analysis of structure conversion and signal acquisition. The laboratory focuses on testing the significant hardware elements from acquisition structures
COURSE CONTENT: Chapter 1. Theoretical basis of numerical acquisition of signal: analog-digital conversion, sampling, algorithmic acquisition, digital acquisition systems architecture. Chapter 2. Data conversion circuits: dependent functional and quality indicators, digital-to-analog converters, analog to digital converters. Chapter 3. Sensors and analog conditioning circuits: classes of sensors, measuring amplifiers, anti-alias filters. Chapter 4. Hardware basics of virtual instrumentation
Laboratory: L1, 2: Study of analog to digital converters by comparison. L3, 4: Study of classical structures of signal conditioning and conversion into numeric values. L5, 6: Study of typical structures associated to conditioning electric transducers. L7: Laboratory Test
TEACHING LANGUAGE: Romanian
EVALUATION: Project
BIBLIOGRAPHY:

D. Sheingold, Analog-Digital Convertion Handbook, P. Hall, '86.
A. van Putten, Electronic Measurement Systems, Prentice Hall, 1988.
F. Coulon, Théorie et traitement des signaux, P.P. Romandes,´90.
Horst Zander, Datenwandler, Vogel, 1990.
Chester Nachtigal, Instrumentation and Control, J. Wiley, 1990
R. Pallas-Areny, Sensors and Signal Conditioning, J. Wiley, 1991.
R. van der Plassche, Integrated A/D D/A Converters, Kluwer , '94.
J. Proakis, D. Manolakis, Digital Signal Processing, P. Hall, 2005.
S. Tumanski, Principles of Electrical Measurement, Taylor, 2006.
F. Maloberti, Data Converters, Springer, 2007.

SUBJECT: OPTOELECTRONICS

NUMBER OF CREDIT POINTS: 4
SEMESTER: I
COURSE TYPE: field related
COURSE OBJECTIVES: The aim of the course is that the students assimilate the knowledge necessary for understanding the operation and use of optoelectronic devices, understanding the functioning and design of circuits with optoelectronic devices, of circuits dedicated to the transmission of information through optical fiber, of fiber optic sensors, and also learning how to use specific instrumentation in order to determine the performance of studied circuits
COURSE CONTENT: 1. Fundamentals of the physics of light. 1.1. Generalities. 1.2. Information on optical wave. 1.3. Information on corpuscular optics. 1.4. Information on radiometry and photometry. 1.5. Elements and optical systems. 2. Semiconductor luminescent sources. 2.1. Introduction. Types of emission. 2.2. The basic structure of semiconductor luminescent sources. 2.3. Luminescent sources based on spontaneous emission and applications. 2.4. Luminescent sources based on stimulated emission and applications. 2.5. Luminescent sources based on super radiant and applications.3. Quantum detectors and applications. 3.1. Photoelectric effect. 3.2. Features of quantum detectors. 3.3. Surface detector with photoelectric effect and applications. 3.4. Detectors with internal photoelectric effect and applications. 3.5. Noise in quantum detectors. 4. Optical fiber sensors. 5. Optoelectronic devices with passive operating (liquid crystal). 5.1. Generalities. 5.2. Operation. 5.3. Applications. 6. Optical fibers. 6.1. Generalities. Theoretical basis of the guide of light beams through optical fibers. 6.2. Characteristics of optical fibers. Manufacturing and written examination ples of optical fibers. 6.3. Optical coupling between luminescent sources and optical fiber . 6.4. Applications optical fiber in telecommunications.
Laboratory:
Presentation of laboratory equipment and labour protection training. Optoelectronic devices. Application of optoelectronic devices. Recoveries. Knowledge verification
TEACHING LANGUAGE: Romanian
EVALUATION : Colloquium
BIBLIOGRAPHY:

Doicaru, E., Dispozitive electronice, Editura Universitaria, Craiova, 2002.
Dascălu, D. ş.a., Dispozitive și circuite electronice, Editura didactică și pedagogică, București. 1982.
Iancu, O., Dispozitive optoelectronice, Editura Matrix Rom, București, 2003.
Manea, A., Sisteme optice pentru comunicaţii, Editura Matrix Rom, București, 2006.
Doicaru E., M. Maria, Optoelectronică. Lucrări practice, Editura Reprograph, Craiova, 2010.

SUBJECT: DECISION AND ESTIMATION IN INFORMATION PROCESSING

NUMBER OF CREDIT POINTS :4
SEMESTER: I
COURSE TYPE: field related
COURSE OBJECTIVES: This is one of the fundamental disciplines of the curriculum for this license area. It contributes to the development of future electronics engineers, providing them knowledge in the theory of information transmission. They deal with basic concepts used in the design and implementation of data transmission systems. The laboratory is designed to secure the knowledge and understanding of phenomena through practical applications.

COURSE CONTENT: 1. Signals used for data transmission. 1.1 Representation of signals by systems of orthogonal functions. 1.2 Analysis and synthesis of signals using generalized Fourier series. 1.3 signal analysis using Fourier transforming. Spectral density function. 1.4 Encoded signals NRZ, RZ, MLB. 1.5 Codes for the representation of information. 1.6 The coding efficiency. Compression factor. 1.7 Random Signals. Statistical averages and time averages. 2. Signal detection with transmission systems. 2.1 The model of a transmission system with detection of signals. 2.2 Observation of random signals at discrete points in time. 2.3 Bayes criterion. 2.4 Detection of a signal of known amplitude. 2.5 Detection of a known signal form. 2.6 Detection of binary signals using the correlation receiver. 2.7 Detection of binary signals using the coherence function. 3. Transmission systems with parameter estimation. 3.1 The model of a transmission system with parameter estimation. 3.2 Estimation of a random parameter. 3.3 Estimation based on minimum mean square error. 3.4 Estimation based on maximum a posteriori probability density. 3.5 Estimation of a signal amplitude constant over time. 3.6 Estimating an unknown deterministic parameter. 3.7 Estimation of the transfer characteristics of a channel. 3.8 Criteria for assessing the quality of the estimation. 4. Optimal reception of discrete modulated signals. 4.1 Estimation of the signal shape. Optimal filtering of continuous signals. 4.2 Wiener optimal filtering. 4.3 Kalman-Bucy optimal filters. 5. Transmission systems resistant to interference. 5.1 Characteristics and general performance of systems with spread spectrum (SSS). 5.2 General principles to achieve SSS. 5.3 Basic modulation methods used in SSS. 5.4 Technique "direct sequence" (DS). 5.5 Modulation, correlation and demodulating in SSS-DS. Specific circuits. 5.6 Technique "frequency hopping" (FH). 5.7 Modulation, correlation and demodulating in SSS-FH. Specific circuits. 5.8 Multiple access and selective addressing in SSS. 5.9 Achievements and Perspectives in SSS

Laboratory:

1. Four-channel communication system using sampled signals (model) 2. Detection of a known signal amplitude (computer simulation) 3. Detection of binary signals using the correlation receiver (computer simulation) 4. Extracting useful signal from the signal disrupted. Design of FIR type digital filters (computer simulation) 5. Extracting useful signal from the signal disrupted. Design of IIR type digital filter design (computer simulation) 6. Estimation of signal shape. Optimal filtering of continuous signals (computer simulation).

TEACHING LANGUAGE: Romanian

EVALUATION: Written examination

BIBLIOGRAPHY:

Carbon M., Exercices résolus de mathématiques du signal, Ed. Dunod Paris 1992

Cullman G., Coduri detectoare și corectoare de erori, Ed. Tehnică București 1972

Dobrescu R., Transmiterea datelor, Editura Academiei Române, București, 2005

Duvant P., Traitement du signal, Ed. Hermes - 1990

Feher K., Comunicaţii digitale avansate, vol. I, Ed. Tehnică București 1993

Feher K., Comunicaţii digitale avansate, vol. II, Ed. Tehnică București 1994

Held G., Data Compression. Techniques and Applications. Hardware and software, Ed. John Wiley&Sons1985

Held G., Comunicaţii de date, Editura Teora, Bucureşti, 1998.

Iancu E., Teoria transmisiei datelor, Editura Universitaria, Craiova, 2004.

Iancu E., Transmisii de date , îndrumar de laborator 1995, Reprografia Universităţii din Craiova

Proakis J., Communication Systems Engineering, Prentice Hall International Editions, 1994.

Reinhard H., Cours de mathématiques du signal, Ed. Dunod Paris - 1992

Spătaru Al., Fondements de la théorie de la transmission de l'information, Presses Polytechniques Romandes, 1987

Tugal D., Data Transmission. Analysis, Design, Application consideration , McGraw-Hill Book Company 1982.

SUBJECT: Microwave

NUMBER OF CREDIT POINTS :4

SEMESTER: II

COURSE TYPE: field related

COURSE OBJECTIVES: The aim of the course is that the students assimilate the knowledge necessary for understanding the functioning, design and use of uniform waveguides, directional and power couplers, microwave filters, microwave semiconductor devices, microwave amplifiers and microwave generators. The tutorial is designed to secure the theoretical knowledge and to develop the skills through computer exercises and problems.

COURSE CONTENT: 1. Uniform waveguides. 1.1. Definitions. Classification. 1.2. Maxwell's equations. 1.3. Wave equation and the equation of the membrane. 1.4. Propagation modes and boundary conditions. 2. Uniform waveguides with TEM propagation mode. 2.1. Line equations and their solutions in steady state. 2.2. Distributions of voltages and currents, standing waves. 2.3. The input impedance of the lines. 2.4. Uniport and two-port line. Adjustment circuits with lines. 2.5. Power transmission using lines. 2.6. Types of lines used in high frequency. 3. Uniform waveguides with TE or TM mode of propagation. 3.1. Parameters propagation characteristics. Transmission of power. 3.2. Rectangular waveguides. 3.3. Circular waveguides. 3.4. Plate waveguides. “dielectric plate” waveguides type. " 4. Elements of the theory of linear microwave circuits. 4.1. Generalized Waves of power. 4.2. Matrix of distribution S and its properties . 4.3. Properties of some classes of multiport 5. Directional couplers and power dividers. 5.1. Directional couplers coupled by line sections. 5.2. Directional couplers with coupled lines. 5.3. Directional couplers with coupling slots. 5.4. Applications of directional couplers. 5.5. Power dividers. 6 Microwave filters. 6.1. Generalities. Prototype filters. 6.2. Features and technological limitations related to achieving microwave filters. 6.3. Types of filters used in practice. 7. Non-reciprocal ferrite devices. 7.1. Generalities. 7.2. The propagation of electromagnetic wave in polarized ferrite. 7.3. Non-reciprocal ferrite devices. 8. Microwave amplifiers with transistors. 8.1. Generalities. 8.2. The stability of a amplifier stwp with transistor. 8.3. Unilateral transistor. 8.4. The noise of amplifiers with transistor. 9. Special electronique tubes for microwaves. 9.1. Characteristics of electronic tubes for microwave. 9.2. Klistron reflex. 9.3. The magnetron. 9.4. The tube with traveling wave. 10. Devices for microwaves. 10.1. Uniport devices with negative resistance. 10.2. Detecting and changing frequency diodes. 10.3. Oscillator and amplifier diodes. 10.4. PIN diode. Varactor diode. Steprecovery diode (SR). 10.5. EnChapsulation of microwave diodes.

Tutorial:

1. Uniform waveguides with TEM propagation mode. 2. Uniform waveguides with TE or TM propagation mode. 3. Elements of the theory of linear circuits of microwaves . 4. Microwave amplifiers with transistors .

TEACHING LANGUAGE : Romanian
EVALUATION: Written examination
BIBLIOGRAPHY:
Lojewski G., Microunde. Dispozitive și circuite, Editura Teora, București, 1999.
Lojewski G., Linii de transmisiuni pentru frecvențe înalte, Editura Tehnică, București, 1998.
Rulea G., Tehnică microundelor, Editura Didactică și Pedagogică, București, 1981.
Antonescu G., Amplificatoare cu semiconductoare pentru microunde, Editura Tehnică, București, 1991.

SUBJECT: DIGITAL PROCESSING OF SIGNALS

NUMBER OF CREDIT POINTS: 4
SEMESTER: II
COURSE TYPE: field related
COURSE OBJECTIVES: The course presents concepts related to spectral analysis through numerical techniques and also for digital filters. The laboratory allows the exemplification of the main numerical techniques of spectral analysis (for deterministic and random signals) with Matlab support. The project allows the comparative analysis of main methods of designing digital filters (FIR-type whith linear phase and adaptive – and also IIR type);
COURSE CONTENT: Chapter 1. Signal processing problems. 1.1. Signal processing, types of processing, written examination ples. 1.2. Anticipatory signal processing. 1.3. Windows and windowing. 1.3.1. Rectangular windows. 1.3.2. Other types of windows. 1.4. Basic processing; written examination ples. Chapter 2. Discrete systems and the Z transforming. 2.1. Discrete systems; properties. 2.2. Basis of Z transformation. 2.3. Systems description and the transfer function. 2.4. Input-output stability. 2.5. Internal stability. 2.6. Criteria for stability. Chapter 3. Digital filters. 3.1. General Description and classes of numerical filters. 3.2. Frequency characteristics of digital filters. 3.3. Non-recursive filters of linear phase. Chapter 4. Digital filter design. 4.1. Non-recursive filter design through window method. 4.2. The design by frequency sampling method. 4.3. The designing of filters RII (with response at infinite impulse): General Properties. 4.4. Indirect design of filters RII. Specifying the performance of filters. 4.5. The design of analog filters. Frequency transformation for analog filters. 4.6. Conversion of analog filters in digital filters. 4.6.1. Transformation equation method input / output. 4.6.2. Invariance method for response to impulse. 4.6.3. Bilinear transformation method. Chapter 5. Spectral estimation of signals. 5.1. Random signals. 5.2. Estimation theory. 5.3. Applications of estimation theory. 5.4. Direct spectral estimation method (Periodograma). 5.5. Indirect spectral estimation method (Blackman – Tukey Estimator). Chapter 6 Digital processors for signal. 6.1. Features of digital processors for signal. 6.2. Programming of digital processors for signal. 6.3. Systems for development with digital processors for signal. 6.4. Applications of digital processors for signal
Laboratory:
L1, 2: Matlab development environment: sections, structured and object oriented programming, graphics. L3: Meshing limited frequency band signals, spectral description. L4, 5: Variations of algorithms for calculating the discrete-time Fourier transformation; comparative analysis. L6, 7: experimental spectral analysis of deterministic type signals: determining the influence of analysis parameters (resolution in frequency, number of samples, adding zero samples) and initial processing by applying a window (by type of window, the window parameters, positioning toward the processed signal). L8, 9: Experimental Spectral analysis for ergodic random signals (power spectrum estimation) nonparametric methods, parametric methods, comparathive analysis. L10, 11: The design using Signal Processing Toolbox of digital filters. L12, 13: Object oriented design of digital filters using the Filter Design Toolbox. L14: Final test lab.
TEACHING LANGUAGE: Romanian
EVALUATION: Written examination
BIBLIOGRAPHY:
F.Coulon, Théorie et traitement des signaux, P.P. Romandes, ´90.
J.Proakis, D. Manolakis, Digital Signal Processing, P. Hall, 2005.
B. Porat, A Course în Digital signal Processing, J. Wiley, 1996.
A. Antoniu, Digital Filters: analysis, Design and Applications, McGraw-Hill, 1993.
S. Haykin, Adaptive Filter Theory, Prentice Hall, 2001.
A.Mateescu, s.a. Semnale și sisteme, Teora 2000.
A. Mateescu, s.a., Prelucrarea numerică a semnalelor, Ed. Tehnică, 1997.
R. Zaciu, Prelucrarea digitală a semnalelor, Ed. albastră, 2002

SUBJECT: PROGRAMMABLE NUMERICAL ARCHITECTURES

NUMBER OF CREDIT POINTS: 4
SEMESTER: II
COURSE TYPE: specialised
COURSE OBJECTIVES: Knowledge of architecture and operation of some microprocessor of 16/32-bit: Intel 80x86 family. Knowledge of a modern PC / controller architecture, of the system bus PC-104/ISA and PC-104 + / PCI and the interfaces for them. Knowing the architecture and specific peripheral resources for representative families of microcontrollers of 8/16 bit as well as the development environments (software and hardware) used for an application with microcontroller. Developing the Chapacity for selecting a microcontroller (computing power, resources and other criteria) for a specific application.
COURSE CONTENTS: 1. Introduction to computing architectures . Ways of representation of information, arithmetic and logical operations, central units, registers, memory unit, instruction sets, assembly language 2. Introduction to architecture Intel 80x86 , Buses, registers, memory organization and memory models, operating modes for IA32 architecture, data types, data alignment 3. Execution of 80x86 instructions, basic instructions, instruction execution, addressing operands, the line for prefetching (pre-fetch) pipeline, cache memory, superscalar execution, dynamic reordering, 4 VLIW architecture. 4. System Architecture 80x86 Personal Computers, controllers, internal and external buses. 5. PC system buses 104 and ISA, signals description, cycles and timing diagrams, interfaces for I / O devices, memory interfaces 6. system buses PC-104+ and PCI , Variations, signal description, cycles and timing diagrams, elementary I / O interfaces 7. Introduction to microcontroller, Architectures and specific resources, Representative families of microcontrollers, programming languages and environments, tools for testing and debugging applications, criteria for choosing a microcontroller (of a family) 8. AVR family (Atmel), Family architecture, Instruction set and addressing modes, Specific peripheral resources, programming environment AVR Studio and the compiler Win AVR GCC 9. 16LX family (Fujitsu Microelectronics) Family architecture, Instruction set and addressing modes, Specific peripheral resources (CAN bus)

,Programming environment Fujitsu Softune and the development system Dice Kit
Laboratory:
I. The compiler Borland C / C + +, C language, programming DOS IBM-PC (parallel port, serial port, switches) 1. Parallel port Programming: Input / output of general-purpose, interface with an LCD display system, programming mode EPP / ECP 2. Serial port programming, interruptings system, Laboratory test 1 II. 16LX microcontrollers (Fujitsu) , Fujitsu Softune programming environment and development system DiceKit 1. Using I / O ports:7-segment decoder 2. Use of serial port 3. Use of analog-digital conversion system 4. Using CAN Bus, Laboratory Test 2 III. Introduction to VHDL, Xilinx WebPack development environment, the system DigilentIIE 1. Synthesis and implementation of a 7-segment decoder 2. Synthesis and implementation of a number 3. LED 7-segment with multiplexing display System 4. Control of a display system compatible with VGA
TEACHING LANGUAGE: Romanian
EVALUATION: Written examination
BIBLIOGRAPHY:
Nicola, S. Microcontrolere. Aplicații în mecatronică, Ed. Universitaria Craiova, 2005
Kleitz W. Digital and Microprocessor Fundamentals: Theory and Application. Pearson Prentice Hall; 4-th Edition, 2002
Brey,B. The Intel Microprocessors 8086/8088, 80186/80188,80286, 80386,80486, Pentium and Pentium Pro Processor Architecture, Programming and Interfacing, Prentice Hall; 6th Ed., 2002
Barnett., Cox., O'Cull, Embedded C Programming and the Atmel AVR, Thomson Delmar Learning, 2001

SUBJECT: PROGRAMMABLE NUMERICAL ARCHITECTURES - PROJECT

NUMBER OF CREDIT POINTS :1
SEMESTER: II
COURSE TYPE: specialised
COURSE OBJECTIVES: Knowledge of architecture and operation of some microprocessor of 16/32-bit: Intel 80x86 family. Knowledge of a modern PC / controller architecture, of the system bus PC-104/ISA and PC-104 + / PCI and the interfaces for them. Knowing the architecture and specific peripheral resources for representative families of microcontrollers of 8/16 bit as well as the development environments (software and hardware) used for an application with microcontroller. Developing the Chapacity for selecting a microcontroller (computing power, resources and other criteria) for a specific application.
COURSE CONTENTS: 1. Introduction to computing architectures . Ways of representation of information, arithmetic and logical operations, central units, registers, memory unit, instruction sets, assembly language 2. Introduction to architecture Intel 80x86 , Buses, registers, memory organization and memory models, operating modes for IA32 architecture, data types, data alignment 3. Execution of 80x86 instructions, basic instructions, instruction execution, addressing operands, the line for prefetching (pre-fetch) pipeline, cache memory, superscalar execution, dynamic reordering, 4 VLIW architecture. 4. System Architecture 80x86 Personal Computers, controllers, internal and external buses. 5. PC system buses 104 and ISA, signals description, cycles and timing diagrams, interfaces for I / O devices, memory interfaces 6. system buses PC-104+ and PCI , Variations, signal description, cycles and timing diagrams, elementary I / O interfaces 7. Introduction to microcontroller, Architectures and specific resources, Representative families of microcontrollers, programming languages and environments, tools for testing and debugging applications, criteria for choosing a microcontroller (of a family) 8. AVR family (Atmel), Family architecture, Instruction set and addressing modes, Specific peripheral resources, programming environment AVR Studio and the compiler Win AVR GCC 9. 16LX family (Fujitsu Microelectronics) Family architecture, Instruction set and addressing modes, Specific peripheral resources (CAN bus) ,Programming environment Fujitsu Softune and the development system Dice Kit
Laboratory:
I. The compiler Borland C / C + +, C language, programming DOS IBM-PC (parallel port, serial port, switches) 1. Parallel port Programming: Input / output of general-purpose, interface with an LCD display system, programming mode EPP / ECP 2. Serial port programming, interruptings system, Laboratory test 1 II. 16LX microcontrollers (Fujitsu) , Fujitsu Softune programming environment and development system DiceKit 1. Using I / O ports:7-segment decoder 2. Use of serial port 3. Use of analog-digital conversion system 4. Using CAN Bus, Laboratory Test 2 III. Introduction to VHDL, Xilinx WebPack development environment, the system DigilentIIE 1. Synthesis and implementation of a 7-segment decoder 2. Synthesis and implementation of a number 3. LED 7-segment with multiplexing display System 4. Control of a display system compatible with VGA
TEACHING LANGUAGE: Romanian
EVALUATION: Project
BIBLIOGRAPHY:
Nicola, S. Microcontrolere. Aplicații în mecatronică, Ed. Universitaria Craiova, 2005
Kleitz W. Digital and Microprocessor Fundamentals: Theory and Application. Pearson Prentice Hall; 4-th Edition, 2002
Brey,B. The Intel Microprocessors 8086/8088, 80186/80188,80286, 80386,80486, Pentium and Pentium Pro Processor Architecture, Programming and Interfacing, Prentice Hall; 6th Ed., 2002
Barnett., Cox., O'Cull, Embedded C Programming and the Atmel AVR, Thomson Delmar Learning, 2001

SUBJECT: COMMUNICATION SYSTEMS

NUMBER OF CREDIT POINTS :3
SEMESTER:II
COURSE TYPE: field related
COURSE OBJECTIVES: The course aims to introduce the basic concepts of analog and digital communication systems, signal transmission, the study of noise in the system. The laboratory is designed to secure the theory knowledge and to create the programming skills through practical applications, exercises and problems.
COURSE CONTENT: 1. Introduction. 1.1 Elements and limitations of the communication systems. Information, messages, signal elements of a communications system, fundamental limitations. 1.2 Modulation and coding. Modulation methods. Applications and benefits of modulations. Encoding methods and their benefits. 1.3 Historical perspective and the impact on society. 2. Theory of probability and random processes. 2.1. Probability and sampling space. 2.2 Conditional probabilities and statistical independence. 2.3 Random variables and probability functions 3. Random signals and noise. 3.1 Random Processes. 3.2. Random signals. 3.3 Noise 4. Performance of the communication systems affected by noise. 4.1 Performance of Analog communication systems. 4.2. Performance of digital communication systems. 5. The structure of a communication system. 5.1 Structure of a

telephone network. 5.2. The structure of a computer network. 5.3. Internet Structure 6. Underlying technologies for intelligent communication systems. 7. Analog communication systems. 7.1 Receivers for CW modulation. 7.2. Multiplexing systems. 7.3 PLL. 7.4 TV systems 8. Behavior of analog communication systems in the presence of noise. 9. Systems and digital signals. 9.1 systems and digital signals. 9.2 Noise and errors. 9.3 Limitations of tape. 9.4 Synchronization Techniques 10. Behavior of digital communication systems in the presence of noise 11. Channel coding and encryption. 11.1 Detection and correction of errors. 11.2 Linear codes. 11.3 convolutional codes. 11.4 Data encryption

Laboratory:

1. Modulations. 2 Noise 3. Performance of communication systems affected by noise 4. The structure of a communication system –telephone centre 5. The structure of a communication system - Computer Network 6. Analog communication systems 7. Behavior of analog communication systems in the presence of noise 8. Systems and digital signals. 9. Behavior of digital communication systems in the presence of noise 10. ISDN. FAX 11. Coding of speech.

TEACHING LANGUAGE: Romanian

EVALUATION : colloquium

BIBLIOGRAPHY:

Cerbulescu Cătălin, 2004, “Pachete de Programe pentru Comunicații de Date”, Reprografia Universității din Craiova

Terashima, N., 2001. “Intelligent Communication Systems”, 2002, Academic Press

Thomas H. Cormen, 2001, “Introduction to Algorithms”, Second Edition, Copyright © 2001 by The Massachusetts Institute of Technology

Bruce Carlson, 2002, “Communication Systems (4TH Edition)”, McGraw-Hill Higher Education

B. P. Lathi, 1998, “Modern Digital and Analog Communication Systems”, Oxford University Press.

SUBJECT: COMMUNICATION CIRCUITS

NUMBER OF CREDIT POINTS :4

SEMESTER: II

COURSE TYPE: specialised

COURSE OBJECTIVES: The course aims to introduce the knowledge necessary for understanding the functioning of the main types of circuits used in communications, and of the methods of design of some of their applications. The laboratory through theoretical and practical applications performed has the role of assimilation by the students of knowledge and practical skills necessary in this filed.

COURSE CONTENT: 1. Introduction. Revision of some basic circuits used during the course. 2. Basic circuits used in communications: Multipliers. Oscillators. Mixers. Comparator of phase / frequency. Amplifiers and limiters. Filters. Frequency dividers. Line drivers and receivers. Applications. 3. PLL loop: Fundamentals. Noise and response of PLL loop. Special PLL loops. Applications. 4. Frequency synthesizers: frequency synthesizers using different techniques: direct synthesis, multiple loop. Applications. 5. Specialized circuits and applications: modulators and demodulators. Switch matrices Codec-filters,Tunable filters. Transceivers and interfaces to transmit voice / data. Telephone circuits. Transcoders. FI and RF modems. Applications.

Laboratory:

1. Presentation of subject. Labour Protection and safety rules. 2. Applications of multipliers in communications. 3. Applications of OCT in communications. 4. Applications of PLL in communications. 5. Frequency synthesizers. 6. Circuits for stereophonic communications. 7. Recoveries and evaluation

TEACHING LANGUAGE: Romanian

EVALUATION: Written examination

BIBLIOGRAPHY:

Savant,C.J. s.a. „Electronic design - Circuits and systems”, The Benjamin/Cummings Publishing Company, Canada,1991.

Soclof, S. "Desing and Applications of Analog Integrated Circuits ", Prentice Hall,New Jersey,1991.

Rohde, U.L. "Digital PLL Frequency Synthesizers-Theory and Design", Prentice Hall,New Jersey, 1983.

Randall L. Geiger ,Phillip E.Allen , "VLSI Design techniques for analog and digital Circuits " Mc Graw Hill Book Company ,New York 1990.

Vătăşescu, A., ş.a. „Circuite integrate liniare - Manual de utilizare vol.1”, E.T.,București,1979.

Mârza Eugen, ş.a. “Radiocomunicaţii - Fundamente”, Ed. de Vest, Timişoara, 2007.

Räisänen V. Antti, ş.a. “Radio Engineering for Wireless Communications and Sensor Applications”, Artech House, Inc., Norwood, U.K., 2003.

Burns Paul, “Software Defined Radio for 3G”, Artech House, Inc., Norwood, U.K., 2003.

Kenington B. Peter, RF and Baseband Techniques for SDR”, Artech House, Inc., Norwood, U.K., 2005.

De Los Santos J. Héctor, “RF MEMS Circuit Design for Wireless Communications”, Artech House, Inc., Norwood, U.K., 2002.

***** - ”Analog Communications I mod. MCM 20/EV-Handbook”, Elettronica Veneta, Italia, 2006.

***** - ”Analog Communications II mod. MCM 21/EV-Handbook”, Elettronica Veneta, Italia, 2006.

***** - “AM/FM Receiver mod. MCM 22/EV-Handbook”, Elettronica Veneta, Italia, 2006.

***** - ”PLL&Stereo FM Transmitter mod. MCM 23/EV-Handbook”, Elettronica Veneta, Italia, 2006.

SUBJECT: RADIOCOMMUNICATIONS

NUMBER OF CREDIT POINTS: 3

YEAR / SEMESTER: II

COURSE TYPE: specialised

COURSE OBJECTIVES: The course aims that the students assimilate theoretical and practical knowledge related to radio communication systems as well as specific equipment to such systems. The laboratory allows the assessment of theoretical knowledge and familiarity with typical parameters of radio communication equipment.

COURSE CONTENTS: 1. Introduction: Definition, the field to which it is related, historic, structure and technical characteristics of a radio system. 2. Propagation of electromagnetic waves: Generalities, the effect of the Earth's surface and atmosphere on propagation, the dependence of propagation of radio frequency range (UL, UM, U.S., USS), microwave propagation. 3. Aerials: parameters, constructive types , radiant systems. 4. Types of modulation: MA (classic MA, MA-PS-BLU MA, MA-RBL), MF, MP. Modulators and demodulators. 5. Sources of radio-frequency oscillations: harmonic oscillators, frequency synthesizers, loop riding phase (PLL). 6. Radio transmitting equipment: role ,specific aspects, characteristics, classification, block diagrams. 7. Radio equipment: functions, parameters, classification block diagrams. 8. Multiple access radio systems: Generalities, multiplexing and multiple access techniques, frequency and

time division etc. 9. Spread spectrum radiocommunication systems: introduction, historical, pseudo-random sequences.
Laboratory:
1. MA superheterodyne receiver. 2. Classic MA and RAA detector. 3. FI amplifier. 4. Block RF-MA. 5. The Transmitter MA. 6. MF receiver. 7. FM demodulator. 8. The block FI-MF. 9. The block RF-MF. 10. MF transmitter.
TEACHING LANGUAGE: Romanian
EVALUATION: Written examination
BIBLIOGRAPHY:
Filipescu V., Note de curs Radiocomunicaţii, 2008;
Cehan, V., Bazele radioemiţătoarelor, Ed. MatrixRom, București, 1997;
Ivanciovici, M., Instalaţii de radioemisie, IPB 1983 ;
Marghescu, I., Zamfirescu, D., Radiotehnică I și II, IPB, 1983 și 1986;
Marghescu, I., Sisteme de Radiocomunicaţii, Curs Universitatea "Politehnica" București,
http://www.comm.pub.ro /curs/src/curs_ro.htm, 2002 ;
Mârza, E., ş.a., Radiocomunicaţii – Fundamente, Ed. de Vest, Timisoara, 2007;
Poole, I., Noțiuni de tehnica radio, Ed. Teora, 2001.

SUBJECT: Digital systems - PROJECT

NUMBER OF CREDIT POINTS: 2
SEMESTER: II
COURSE TYPE: expert
COURSE OBJECTIVES: 1. Communication of project theme and marking method. The composition of the block diagram of the digital system. Proposing concrete schemes for each component block, on working groups. Homeworks. 2. Discussing the variants of proposed schemes and completion of the final scheme. Homeworks. 3. Simulation of the scheme on working groups. Homeworks. 4. The practical realization and testing of each component block, on working groups. 5. Oral written examination ination in the form of multiple choice test.
TEACHING LANGUAGE: Romanian
EVALUATION: Project
BIBLIOGRAPHY:
Filipescu, V., Circuite electronice digitale, Editura UNIVERSITARIA Craiova, 2002;
Filipescu, V., Circuite integrate digitale – Îndrumar de laborator, Editura UNIVERSITARIA, 2009;
Maican, S., Sisteme numerice cu circuite integrate - culegere de probleme, Editura TEHNICA, Buc., 1980;
Millman, J., Grabel, A., Microelectronique, McGraw-Hill, 1991;
Ştefan, Gh., Circuite integrate digitale, Editura DENIX, București, 1993;
Sztojanov, I., ş.a., De la poarta TTL la microprocesor, Seria Electronică aplicată, Editura TEHNICA, Buc., 1987;
Toacşe, Gh., Nicula, D., Electronică digitala, Editura TEORA, 1996;
Toacşe, Gh., Nicula, D., Electronică digitala. Dispozitive – circuite – proiectare, Editura Tehnică, București, 2005;
Wakerly, J. F., Circuite digitale. Principiile și practicile folosite în proiectare, Editura Teora, București, 2000.
http://www.datasheetcatalog.com/.

SUBJECT: PRACTICE 2

NUMBER OF CREDIT POINTS: 5
SEMESTER: II
COURSE TYPE: field related
TEACHING LANGUAGE: Romanian

EVALUATION: Colloquium

4-TH YEAR

SUBJECT NAME: POWER ELECTRONICS

NUMBER OF CREDIT POINTS: 5
SEMESTER: I
TYPE OF COURSE: speciality
COURSE OBJECTIVES:
It is one of the specialized disciplines of the curriculum for this bachelor area. The course aims to introduce the basic concepts of power electronics. The laboratory is designed to improve the theoretical knowledge and to develop programming skills by means of practical applications, exercises and problems
COURSE CONTENT: 1. Introduction 2. Devices used in power electronics: transistor, thyristor, IGBT, IGCTI, intelligent power modules 3. Classification of converters 4. Rectifiers : Uncontrolled, Controlled 5. Variable DC voltage 6. Invertors: I. monophased, I. three phased 7. Alternative dimmers: VTA monophased, VTA three phased 8. Application field of converters
Laboratory:
1. Inertia monophase Rectifiers 2. SPICE modeling 3. Redresoare necomandate trifazate 4. Modelarea SPICE of the unsolicited three phased rectifier 5. Variable AC voltage 6. VTA SPICE Modeling 7. Controlled rectifiers 8. SPICE modeling of the controlled rectifier 9. Monophase invertors 10. SPICE Modeling of the invertor 11. Dimmers of constant voltage 12. VTA SPICE Modeling
TEACHING LANGUAGE: Romanian
EVALUATION: written examination
SELECTIVE BIBLIOGRAPHY :

1. Cerbulescu D., Cerbulescu C., Convertoare Statice de Putere. Circuite de comandă. Reprografia Universității Craiova, 1995
2. Cerbulescu D., Cerbulescu C., Convertoare Statice de Putere. Vol I și II Ed. Universitaria, 1995
3. Matlac I., Convertoare Electro-energetice, Ed. Facla, 1998.

SUBJECT NAME: POWER ELECTRONICS - PROJECT

NUMBER OF CREDIT POINTS: 1
SEMESTER: I
TYPE OF COURSE: field related
COURSE OBJECTIVES: It is one of the specialized disciplines of the curriculum for this bachelor specialisation. The course aims to introduce the basic concepts of power electronics. The laboratory is designed to improve the theoretical knowledge and to develop programming skills by means of practical applications, exercises and problems
COURSE CONTENT: 1. Introduction 2. Devices used in power electronics: transistor, thyristor, IGBT, IGCTI, intelligent power modules 3. Classification of converters 4. Rectifiers : Uncontrolled, Controlled 5. Variable DC voltage 6. Invertors: I. monophased, I. three phased 7. Alternative dimmers: VTA monophased, VTA three phased 8. Application field of converters
Laboratory:
1. Inertia monophase Rectifiers 2. SPICE modeling 3. Redresoare necomandate trifazate 4. Modelarea SPICE of the unsolicited three phased rectifier 5. Variable AC voltage 6. VTA SPICE Modeling 7. Controlled rectifiers 8. SPICE modeling of the controlled rectifier 9. Monophase invertors 10. SPICE Modeling of the invertor 11. Dimmers of constant voltage 12. VTA SPICE Modeling
TEACHING LANGUAGE: Romanian
EVALUATION: project
SELECTIVE BIBLIOGRAPHY :

1. Cerbulescu D., Cerbulescu C., Convertoare Statice de Putere. Circuite de comandă. Reprografia Universității Craiova, 1995
2. Cerbulescu D., Cerbulescu C., Convertoare Statice de Putere. Vol I și II Ed. Universitaria, 1995
3. Matlac I., Convertoare Electro-energetice, Ed. Facla, 1998.

SUBJECT NAME: TELEVISION SYSTEMS

NUMBER OF CREDIT POINTS: 5
SEMESTER: I
TYPE OF COURSE: field related
COURSE OBJECTIVES: The course aims at developing students' theoretical knowledge about distance transmission, reception and processing images. The laboratory courses imporove theoretical knowledge and students' familiarity with specific parameters and television systems characteristic signals.
COURSE CONTENT: 1. Introduction. Transmitting image. History. 2. Features of the visual analyzer. Perception (luminance, contrast, spatial detail, noise)3. Notion of colorimetry. Blending colors. Grassman's Laws. colorimetric systems. 4. TV systems in black and white. TV image signal decomposition and formation. Calculation of fmax and fc. Image signal. Extinguishing and synchronization signals. Complex video signal. 5The frequency spectrum of the television signal. AN spectral distribution of the video signal. AN-TV signal transmission distance. 6. Colour television systems (TVC). General concepts. Historical - Classification of TVC and common characteristics of the system. TVC compatibile. 7. Quadrature modulation (MAQ-PS). Cases. MAQ demodulation. 8. NTSC system. Principles. Signals used. Reducing the amplitude, the rotation of the phase, the CVBS- NTSC color synchronization signal. 9. Selection of the NTSC subcarrier NTSC encoder and decoder. 10. PAL system. Features. Encoding and decoding the chrominance signals. Additive composition of modulation products of the chrominance subcarrier in the PAL receiver PAL 11. Synchronization signals of the color subcarrier and line identification. Subcarrier selection criteria. PAL encoder and decoder 12. SECAM system: developing the basic principle, signals of bases. Modulation. Modulation parameters. MF Modulation. Emphasizing the IF. 13. Chrominance signals, timing and SECAM identification. The encoder and decoder SECAM. 14. Comparison of major TVC systems. TVC. Transcoding signals
Laboratory:
1. Types of television signals. 2. The television studio: general overview, block diagram and description of component parts, forming TV broadcast signal. 3. Block diagram of a color TV, operation and specific signals. 4. Horizontal Floor scanning: theoretical considerations, running, signals 5. Vertical Floor scanning: theoretical considerations, running, signals 6. Small-signal circuits: channel selector, Small-signal circuits made with TDA 8305. 7. Color decoder for NTSC, PAL and SECAM: theoretical considerations, implications for specific schemesBrightness and chrominance information. 8. Chrominance signals in PAL and SECAM. 9. Color TV signal, luminance signal for various TV mire. 10. Color TV signal, chrominance signal for various TV mire. Note: The paper No.2 takes place in The television studio "TELEUNIVERSITATEA" University of Craiova
TEACHING LANGUAGE: Romanian
EVALUATION: written evaluation
SELECTIVE BIBLIOGRAPHY:

1. Damachi, E., ş.a., "Televiziune", EDP, București, 1983;

2. Mitrofan, Gh., "Introducere în televiziune", Ed. Teora, 1993;
3. Raymond, G., "Tehnică televiziunii în culori", ET, București, 1971;
4. Tancock, M., "Broadcast television fundamentals, Pentech Press, London, 1991.

SUBJECT: MOBILE COMUNICATION

NUMBER OF CREDIT POINTS: 4
SEMESTER: I
COURSE TYPE: speciality
COURSE OBJECTIVES: The course aims to introduce the knowledge necessary for understanding the functioning of main mobile communication systems used, their characteristics and the standards used in this field. The laboratory, through theoretical and practical applications, has the role of assimilation by the students of knowledge and practical skills necessary in this field
COURSE CONTENT: 1.Introduction: Definition and classification of SRCM. Multiple access techniques. 2. Professional mobile communication systems: Definition. Simplex PMR systems, conventional and trunking. Selective calling and signaling procedures. Standards. 3. Cordless systems: Definition, types, architectures and standards. 4. Cell Systems: Definition. Traffic notions. Managing frequencies. Use of sectored cells. Managing channels. 5. GSM: Definition, architecture, technical features. Information coding in GSM. GSM Evolution. GPRS system: architecture, canals. Evolution to 3G. 6. Principles of CDMA systems: CDMA methods: characteristics and properties. CDMA transmitters and receivers. Variants of CDMA systems. PN sequences and orthogonal codes. DS-CDMA receiver. 7. UMTS system: Standardization in 3G. UMTS network principles. The functions and architecture of terrestrial core networks. Radio user-network interface. 8. Wireless Technologies: WLAN and WPAN technologies. Bluetooth.
Laboratory: 1. Presentation of topics. Safety induction and PSI rules. 2. TDMA transmissions in mobile communications: 3. Estimating traffic, frequency allocation, sectoring in cellular systems 4. PSK transmissions in mobile communications 5.GSM-architecture system, call, connection establishment and termination: 6. Recoveries and evaluation
TEACHING LANGUAGE: Romanian
EVALUATION: Colloquium
SELECTIVE BIBLIOGRAPHY:
1. Taub, H. & Schilling, D.L. "Principles of communication systems", Mc-Graw-Hill Book Company,1986.
2. Proakis, J.G. "Digital Communications", Mc-Graw-Hill Book Company,1995.
3. Mârza, E. & Simu, C. "Comunicaţii mobile-principii şi standarde", Editura de Vest, Timişoara, 2003.
4. Nicolaescu, Şt.V. "Sisteme de comunicaţii mobile celulare GSM", Editura AGIR, Bucureşti, 1999.
5. Marghescu, I. & Nicolaescu, Şt.V. "Comunicaţii mobile terestre", Editura Tehnică, Bucureşti, 1997.
6. Prasad Ramjee, ş.a. "Technology Trends în Wireless Communications", Artech House, Inc., Norwood, U.K., 2003.
7. Haykin Simon, ş.a. "Modern Wireless Communications", Pearson Prentice Hall, 2005.
8. Fratu Octavian, ş.a. "UMTS-O Nouă Generaţie în Comunicaţiile Mobile Digitale", Ed. "Electronică 2000", Bucureşti, 2003.
9. ***** - "Pulse Modulation mod. MCM30/EV-Handbook", Elettronica Veneta, Italia, 2006.
10. ***** - "Digital Modulation mod. MCM31/EV-Handbook", Elettronica Veneta, Italia, 2006.
11. ***** - "Trainer of Mobile Phone mod. CTS2/EV-Handbook", Elettronica Veneta, Italia, 2006.

SUBJECT: ELECTRIC AND ELECTRONIC DRIVES

NUMBER OF CREDIT POINTS: 5
SEMESTER: I
COURSE TYPE: speciality
COURSE OBJECTIVES: The course aims to present general concepts related to electrical drives theory as well as operation principles, characteristics and control module of DC motor drive systems, asynchronous motor, permanent magnet synchronous motor and step-by-step motor. The laboratory is designed to give students the opportunity to create experimental assemblies for the major drive systems and experimental improvement of operating characteristics.
COURSE CONTENT: Chap. 1. Electrical drives theory notions. 1.1. The general structure of drive systems, 1.2. Torques 1.3 Reporting torques and moments of inertia, 1.4. Kinematics of electrical drives. 2. DC motor drives- 2.1. Operation principle 2.2. Architectural components 2.3. Operation equations 2.4. Electro-mechanic features, 2.5. Control 2.6. DC motor and controlled rectifiers drive system 2.7. DC motor and DC voltage dimmer drive system. Chap. 3 Three-phase asynchronous motor drive system. 3.1. Operating principle 3.2. Architectural components 3.3. Operation equations, 3.4. Mechanical characteristics 3.5. Control 3.6. Asynchronous motor and voltage inverter drive system 3.7. Asynchronous machine vectorial control notions 3.8. The principle of direct torque control of an asynchronous machine (DTC). Chap. 4. Drives systems with permanent magnet synchronous motor. 4.1. Operation principle 4.2. Architectural components 4.3. Operation equations 4.4. Mechanical features 4.5. Control 4.6. Vectorial control of drive systems with synchronous motor and precise current voltage inverter 4.7. Vectorial control of drive systems with synchronous motor and voltage inverter 4.8. "Fault tolerant" applications Chap.5. Drives with step-by-step motors 5.1. Operation principle 5.2. Architectural components 5.3. Operation equations 5.4. Characteristics, 5.5. Control.
Laboratory:
1. Laboratory presentation, safety 2. Study of speed regulation for drive systems with separate excitation DC motors. 3. Study of the braking mode for separate excitation DC motor actuation. 4. Study of speed regulation for drive systems with asynchronous coiled rotor motor drive systems 5. Study of the braking mode for asynchronous coiled rotor motor drive systems 6. Study of speed regulation for drive systems with separate excitation DC motors and controlled rectifiers in open circuit. 7. Study of speed regulation for drive systems with separate excitation DC motors and DC voltage dimmer (DCVD) 8. Study the drive systems with DC motor and semi-controlled closed loop rectifier.9 Study of asynchronous motor drive system with inverter with U / f control. 10. Study of asynchronous motor drive system with frequency modulation inverter 11. Study of asynchronous motor drive system with frequency modulation inverter and harmonics removal 12. Study of asynchronous motor drive system with vectorial control inverter 13. Study of MPP drive systems. 14. Laboratory report handover.
TEACHING LANGUAGE: Romanian
EVALUATION: written examination
SELECTIVE BIBLIOGRAPHY:
1. A. Bitoleanu – Convertoare statice – aplicații. Sisteme de acționare electrică, Editura Universitaria, Craiova, 1994, ISBN 973-96643-4-2.
2. M Kazmierkowski – Automatic control of Converter-Fed Drive, Elsevier 1994, ISBN 0-444-98660-X.

3. B. Hansruedi - Convertisseurs Statiques, Presses Polytechniques et Universitaires Romandes, Lousane, 1991.
4. S. Ivanov – Note curs.
5. S. Ivanov – Reglarea vectorială a sistemelor de acționare electrică, Tipografia Universității din Craiova, 2000.
6. F. Labrique, H. Buyse, G. Seguier, R. Bausiere – Les convertisseurs de l'électronique de puissance. Vol 5 Commande et comportement dynamique. Lavoisier, Paris, 1998.
7. R. Măgureanu, N. Vasile – Servomotoare fără perii de tip sincron. Editura Tehnică, București, 1990.
8. G. Seguier, R. Bausiere, F. Labrique – Electronique de puissance. Structures, fonctions de base, principales applications. Dunod, Paris, 2004.
9. G. Seguier, R. Bausiere, F. Labrique – Les convertisseurs de l'électronique de puissance. Vol. 4 La convertion continu-alternatif. Lavoisier, Paris, 1995
10. P. Vas – Sensorless Vector and Direct Torque Control, Clarendon Press, Oxford, 1998.

SUBJECT: COMUNICATION ANTENAS

NUMBER OF CREDIT POINTS: 5
SEMESTER: I
COURSE TYPE: speciality
COURSE OBJECTIVES: The course aims to introduce the knowledge necessary for understanding the operation and characteristics of the main types of antennas used for communications. The project, through conducted applications, is intended for the students to assimilate the information presented during the course to develop practical design skills needed in this field.
COURSE CONTENT: 1. Introduction: Getting Started. Antenna types. 2. General features of radio waves: wave types and their polarization. Terms of radiation. Diffraction of waves. Ionosphere and its influence on wave propagation. High frequency wave propagation. 3. Straight antennas: Properties. Thin antenna radiation. Long and medium wave antennas. 4. Nonlinear Antennas: Frame antennas. Rhombic antenna. Very wide band antenna. Spiral antennas. 5. Other types of antennas: Slot antennas. Aperture. Horn antennas. Dish antennas. Surface-wave antennas. 6. Antenna power supply: Problems of adaptation and balancing. Different power supply modes. The efficiency of the antenna system.
TEACHING LANGUAGE: Romanian
EVALUATION: written examination
SELECTIVE BIBLIOGRAPHY:

1. Nicolau, E. - "Antene și propagare", E.D.P., București,1982.
2. Ignea, A. ş.a. - "Antene și propagare", Editura de Vest, Timişoara, 2002.
3. Mârza, E. ş.a. - "Radiocomunicații -Fundamente", Editura de Vest, Timişoara, 2007.
4. Räisänen V. Antti, s.a. "Radio Engineering for Wireless Communications and Sensor Applications", Artech House, Inc., Norwood, U.K., 2003.
5. ***** - "Transmission lines and Antennas mod. LA/EV-Handbook", Elettronica Veneta, Italia, 2006.

SUBJECT: Television Equipment

NUMBER OF CREDIT POINTS: 4
SEMESTER: II
COURSE TYPE: speciality
COURSE OBJECTIVES: The course aims at students acquiring theoretical and practical knowledge related television equipment. Laboratory enables the strengthening of theoretical knowledge taught in the course, familiarization with the features and operation of television equipment and acquiring technical skills in digital editing.
COURSE CONTENT: 1. Video Chapture and reproducing devices. 1.1. Video Chapture devices. 1.1.1. Video Chapture tubes. Classification, characteristics, quality parameters. Dissector, image orthicon and vidicon. 1.1.2.Integrated technology video Chapture devices with frame and line transfer and frames. Room preamplifier. 1.2. Video reproducing devices. Classification. Cathode Ray Tube for TV / AN. Trichromatic CRT. Trinitron tube. Indexing signal tube. Video reproducing LCD and plasma devices. Modern projectors. 2. Studio equipment. 2.1. Component units of a television center. 2.2. Analog and digital video signals from a television studio. 2.3. Coding. Serial transmission of Y signals, C R, C B. Code 8/10. Parallel transmission. D1 and D2 formats. 2.4. Structure of a television studio. A / D and D / A conversion. 2.5. Digital memory in video processing. Digital encoding and decoding. Noise correction. 2.6. Switching and mixing video signals. Mixing additive encrustation, special effects, video effects. 2.7. Recording / playback analog video and audio. Synchronize recording / playback video. 2.8. Electronic assembly. Analogue format video recording 2.9. VCR control system. The input / output signals of the VCR. 2.10. Recording / playback of digital video. International exchange programs. Synchronization in television. Notions. Signal generation. 3. Transmission of television signals. 3.1. Role and hierarchy of transmission channels. Multiplexing in frequency and time. 3.2. Direct transmission in radiofrequency. The polarization of radiated signal. TV broadcast service area. Sporadic propagation. The distribution of TV channels. 3.3. Picture and sound carrier modulation. Radio relay transmission. 3.4. Coax cable and optical fiber. 3.5. Digital video coding systems 4. Reception of satellite TV broadcasts: the area covered by the satellite, the satellite's solar eclipse, satellite coordinates, allocated frequency ranges for satellite TV and radio broadcasts. 4.1. Europe's satellites (low, medium and high power). 4.2. The payload of the satellite. Baseband. 4.3. The type of modulation used in satellite TV broadcasting. MAC coding. 4.4. Terrestrial equipment for satellite TV broadcast reception.

Laboratory:
1. Overview TELEUNIVERSITATEA TV studio 2. Portable and set camera 3. VCR, CD player, Satellite TV reception equipment 4. Switching matrix, Video production mixer; TV Monitor 5. Logo and marvel generators; equipment for viewing waveforms and vectorscope diagram 6. TV broadcast system 7. Digital editing in Adobe Premiere (editing sound, synchronous sound, image editing with different signal sources: land camera, video recording, etc. subtitles, special effects)
TEACHING LANGUAGE: Romanian
EVALUATION: written examination
SELECTIVE BIBLIOGRAPHY:

1. Beeching, S., Servicing Videocasette Recorders, Fourth edition, Butterworth-Heinemann Ltd,
Oxford, 1993
2. Damachi, E., s.a., Televiziune, EDP, București, 1983;
3. Mitrofan, Gh., Televiziunea digitala, Ed. Academiei, Buc. 1986;
4. Mitrofan, Gh., Introducere în televiziune, Ed. Teora, 1993;
5. Mothersole, P., White, N., Broadcast Data Systems. Teletext and RDS, Butterworth & Co
(Publishers) Ltd, 1990;
6. Raymond, G., Tehnică televiziunii în culori, ET, Buc., 1971;

7. Sandbank, C., Digital Television, Wiley, 1992;
8. Stephenson, D.J., Newness Guide to Satellite TV, Second edition, Butterworth-Heinemann Ltd,
Oxford, 1991;
9. Trundle, E., Newness Television and Video Ingineer's Pocket Book, Butterworth-Heinemann Ltd,
Oxford, 1992.

SUBJECT: MICROELECTRONIC STRUCTURE DESIGN

NUMBER OF CREDIT POINTS: 3
SEMESTER: II
COURSE TYPE: speciality
COURSE OBJECTIVES: It is one of the specialized disciplines of the curriculum for this license field. The course aims to introduce the fundamental concepts related to the use of standard SPICE simulation program for designing microelectronic structures. We analyze model types for electronic devices and their implementation, various types of analyzes and simulations of electronic structures. Based on the models and types of analysis, we present electronic subassembly design methods such as current sources, voltage BIBLIOGRAPHY, amplifiers, flip-flop circuits, integrated numeric structures, CMOS technology SOC systems.
COURSE CONTENT: 1. Models for electronic devices used in SPICE-type simulation programs. Mathematical models for diodes, bipolar transistors, JFET, MOSFET, MESFET, macro models for integrated structures, models for power devices triac, thyristor, SCR. Software used for developing simulation models. Testing SPICE models and adding parameters SPICE models. Types of analysis used in SPICE. DC high and low signal analysis. Sensitivity analysis. Analysis of transitional signal, noise and distortion analysis, pole-zero analysis, Fourier analysis and behavior analysis on temperature change. Extensive analysis. Mixed mode simulation. Defining the network list. Syntax elements in various tests. 3. SPICE electronic circuit design. Design methods for analog circuitry such as current sources, amplifiers, voltage BIBLIOGRAPHY, output stages. Design methods for digital circuits. Portable design adders, counters. Integrated SoC systems.
Laboratory:
1. Development of models for diode TB, JFET and MOSFET. 2. Testing macro models and use of specialized programs for the development of models 3. Simulation of AC and DC circuits 4. Transient circuit simulation. Analysis of noise and distortion 5. Design of analog structures. 6. Design of digital structures 7. Final laboratory examination and recoveries
TEACHING LANGUAGE: Romanian
EVALUATION: written examination
SELECTIVE BIBLIOGRAPHY:
1. INTUSOFT, « IsSPICE 4. Users Guide », 2001
2. Andrei Valdimirescu, « The SPICE Book »,1993
3. Joshep.P.Thront « PSPICE for basic Microelectronics with CD » McGraw Hill, 2007
4. Joseph G. Tront., "PSpice for Basic Circuit Analysis",2004
5. Christophe P. Basso, "Switch-Mode Power Supply SPICE Cookbook",2001
6. Paul Tobin." PSpice for Analog Communications Engineering (Synthesis Curss on Digital Circuits and Systems)",2008.

SUBJECT: MICROELECTRONIC STRUCTURE DESIGN - Project

NUMBER OF CREDIT POINTS: 1
SEMESTER: II
COURSE TYPE: speciality
COURSE OBJECTIVES: It is one of the specialized disciplines of the curriculum for this license field. The course aims to introduce the fundamental concepts related to the use of standard SPICE simulation program for designing microelectronic structures. We analyze model types for electronic devices and their implementation, various types of analyzes and simulations of electronic structures. Based on the models and types of analysis, we present electronic subassembly design methods such as current sources, voltage BIBLIOGRAPHY, amplifiers, flip-flop circuits, integrated numeric structures, CMOS technology SOC systems.
COURSE CONTENT: 1. Models for electronic devices used in SPICE-type simulation programs. Mathematical models for diodes, bipolar transistors, JFET, MOSFET, MESFET, macro models for integrated structures, models for power devices triac, thyristor, SCR. Software used for developing simulation models. Testing SPICE models and adding parameters SPICE models. Types of analysis used in SPICE. DC high and low signal analysis. Sensitivity analysis. Analysis of transitional signal, noise and distortion analysis, pole-zero analysis, Fourier analysis and behavior analysis on temperature change. Extensive analysis. Mixed mode simulation. Defining the network list. Syntax elements in various tests. 3. SPICE electronic circuit design. Design methods for analog circuitry such as current sources, amplifiers, voltage BIBLIOGRAPHY, output stages. Design methods for digital circuits. Design of adders, counters. Integrated SoC systems.
Project:
1. The design of very low voltage rectifiers. 2. The design of Widlar type current sources. 3. Design of 8-bit adders in CMOS technology 4. Design of an arithmetic block
TEACHING LANGUAGE: Romanian
EVALUATION: project
SELECTIVE BIBLIOGRAPHY:
1. INTUSOFT, « IsSPICE 4. Users Guide », 2001
2. Andrei Valdimirescu, « The SPICE Book »,1993
3. Joshep.P.Thront « PSPICE for basic Microelectronics with CD » McGraw Hill, 2007
4. Joseph G. Tront., "PSpice for Basic Circuit Analysis",2004
5. Christophe P. Basso, "Switch-Mode Power Supply SPICE Cookbook",2001
6. Paul Tobin." PSpice for Analog Communications Engineering (Synthesis Curss on Digital Circuits and Systems)",2008.

SUBJECT: ADVANCED MECATRONIC STRUCTURES

NUMBER OF CREDIT POINTS: 3
SEMESTER: II
COURSE TYPE: speciality
COURSE OBJECTIVES: It is a specialized discipline in the terminal year. The course helps to train future engineers, ensuring their knowledge of design, construction and operation of mobile robots. The laboratory is designed to create practical skills in this field.
COURSE CONTENT: Mobile robotics specific features, construction and sizing of wheel supported mobile robot. Mathematical models of wheel supported mobile robots. Locating mobile robots operating scenarios. Path planning for mobile robots. Connecting of global path sections. Wired path navigation systems. Stored path navigation systems.
laboratory:
Study of LINE TRACKER mobile robot. Study of WAO II mobile robot. The study of a walking mobile robot. The study of a microcontroller drive system mobile robot. Case studies

in mobile robotics, video analysis. Mobile robotics news, videos from various international conferences

TEACHING LANGUAGE: Romanian

EVALUATION: written examination

SELECTIVE BIBLIOGRAPHY:

Niţulescu, M., Roboţi mobili, Ed. Sitech Craiova, 1999.

Mair, M. G., Industrial robotics, Prentice Hall International Inc. 1988.

Nof, Y. S., Handbook of industrial robotics, Krieger Publishing Company, 1992.

Warnock I., Programmable controllers, operation and application, Prentice Hall International Inc., 1988.

Sandler B., Robotics, designing the mechanisms for automated machinery, Prentice Hall International Inc., 1991.

Klafter, R., Chmielewski, T. Robotic engineering, an integrated approach, Prentice Hall, 1989

Niţulescu, M., Sisteme robotice cu Chapacitate de navigaţie, Ed. Universitaria Craiova, 2002.

Ivănescu, M., Niţulescu, M., Robotica I, Îndrumar de laborator, Reprografia Universităţii din Craiova, 1993.

***, Materiale de firmă pentru roboţii existenţi în dotare.

Decan,
Prof.univ.dr. Eugen BOBAȘU