NETWORKS AND SOFTWARES FOR TELECOMMUNICATIONS (2018 - 2019 academic year)

1st year of study – 1st semester (autumn)

Mathematical Analysis – Loredana IAMBOR

1. The real numbers: some basic concepts
2. Sequences of real numbers
3. Series of real numbers; Series with nonnegative terms (I)
4. Series with nonnegative terms (II); Alternating series
5. Limits, continuity and differentiation of real-valued functions of one real variable
6. Higher order derivatives; Taylor series and power series
7. The Riemann integral; Improper integrals
8. The Euclidean (topological) space ; Sequences of points in
9. Limits and continuity of real-valued functions of several variables
10. Partial derivatives and the differential
11. Local extremum points for real-valued functions of several variables
12. Double integrals. Triple and multiple integrals. Change of variables
13. Surface integral. Flux of vector field across a surface. Stokes' Theorem

Linear algebra, analytical and differential geometry – Dorina FECHETE

1. Preliminaries (sets, relations, functions, algebraic structures, matrices, determinants, systems of linear equations)
2. Vector spaces. Properties and examples
3. Basis and dimension of a vector space
4. Change of basis of a vector space
5. Subspaces
6. Linear transformations. Definitions and properties
7. Matrix of a linear transformation
8. Eigenvalues and eigenvectors; Matrix diagonalizations
9. Bilinear forms and quadratic forms
10. Inner-products, norms and metrics
11. Euclidean vectors
12. Analytic geometry
    - Equations and curves
    - Lines and planes
    - Conic sections
    - Quadric surfaces
13. Differential geometry of curves and surfaces

Physics – Sanda FILIP

Elementary Mechanics

I.Kinematics

Simple Motion in One, Two or Three Dimensions.
Inertial and Non-Inertial Reference Frames.

II. Dynamics

Newton's Laws. Conservation of Mechanical Energy.
Generalized Work-Mechanical Energy Theorem for Systems of Particles.
Center of Mass. Collisions.

III. Gravity

Kepler's Laws. Newton's Law of Gravitation.
The Gravitational Field. Gravitational Potential Energy.

IV. Oscillations

The Simple Harmonic Oscillator. Y motion. Applications of simple harmonic movement.
Damped Oscillation. Damped, driven Oscillations. Resonance.

Two Dimension Oscillations.

V. Elastic Properties of Materials - Fluids. Waves.

Static Fluids. Fluid Flow. Fluid Viscosity.

Solutions to the Wave Equation. Sound Wave in a Fluid.

2. Molecular Physics and Thermodynamics

I. Kinetic Molecular Theory of Gases (KMT).

Atomic Concept on the Structure of Molecules.

General Notions in Molecular Physics.

II. Kinetic Theory of Ideal Gases

The Ideal Gas Model.

Temperature and KMT.

Joule's law. Equation of Ideal Gas.

III. Basic concepts of thermodynamics

General notions.

The General Principle and Zeroth Low of Thermodynamics.

Temperature in Thermodynamics.

IV. First Low of thermodynamics

Thermodynamics and Energy.

Heat, Work and Calorimetry.

Heat coefficients.

Ideal Gas Thermodynamics: Specific Heats, Isotherms, Adiabats.

V. The Second Low of Thermodynamics

Heat Engines.

The Second Low for Bitermal cyclic transformations. The Carnot Cycle.

The Second Low for Nonstatic-Irreversible Processes

The Third Low of Thermodynamics

3. Optics

The Fundamental Laws of Geometric Optics

Reflection and refraction of Light Rays

Optical prism and Optical Lenses

Optical Instruments

4. Atomic and Nuclear Physics

Elementary Atomic and Nuclear Physics

Atoms and Electromagnetic Waves

Nuclear Models. Nuclear Properties.

Nuclear Decay and Radioactivity.

5. Applications of Physics in Engineering Sciences

Applied Informatics – Laviniu ȚEPELEA

1. Introductive notions. DOS operating system.
2. Windows operating system. Linux operating system.
3. Microsoft Word.
4. Microsoft Excel.
5. Microsoft Powerpoint.
6. Microsoft Visio.
7. Electronic diagrams in Microsoft Visio.
8. Electronic simulation softwares.
9. Circuit Design Suite (Multisim).
10. Proteus Desgin Suite.
11. LTSpice.
12. Using PonyProg software.
13. Using Mikroelektronika Programming Tools.
14. Using Microchip Programming Tools.

Internet services – Adrian ȘCHIOP

1. Search engines. Web portals
2. Creating a Web page using HTML language. Basic tags.
3. Text formatting.
4. Colors Inserting images and hyperlinks. Special characters in HTML.
5. Advanced HTML tags. Multimedia and objects. Webpage layout.
6. Using styles (CSS) in a web page.
7. Javascript. Events and variables treating.
8. Web form

Computer programming and programming languages I – Florin VANCEA

1. Introduction. Hardware reference structure.
2. Algorithms. Programming flowcharts.
3. C program structure
4. Storing data in memory, data type concept, C-specific datatypes, variables.
5. Simple input-output.
6. Assignment, expressions.
7. Cyclic instructions
8. Composed datatypes - arrays, structures.
9. Character string processing.
10. Subprograms - procedures, functions, parameter handling.
11. Variable accessibility.
12. Modularization of large programs.
13. Files. Graphics basic notions.
14. Distributed processing notions. Internet.

Passive components and circuits – Simona CASTRASE

1. Electrostatics. Electric field. Electrical potential and electrical voltage.
2. The electric flow. Gauss's Law. Applications to field and electrostatic potential calculation
3. Electrokinetic. Electric current. Electromotor voltage. Electric conduction. Law electrical conduction
4. Ohm Law. Joule-Lenz Law. Electricity Conservation Law. Kirkhoff's theorems.
5. Electromagnetism. The magnetic field. Magnetic induction. Magnetic Field Intensity. Forces exerted by the magnetic field Passed by electric currents.
6. Passive circuit components. General properties of passive components.
7. Resistors. Connection of resistors. Applications.
8. Electrical Capacitor. Electrical Capacity. Equivalent capacitance of capacitors
9. Coil. Inductance. The Law of Induction. Energy and forces of the magnetic field.
10. Regimul dinamic în circuite pasive. Circuite RL si RC in curent continuu
11. Circuits in alternating sinusoidal mode. Alternative sinusoidal sizes. Methods of resolving circuits in sinusoidal mode.
12. Passive circuit elements in the c.a. Circuits with resistors, coils and capacitors in c.a.

English language I – Simona ABRUDAN CACIORA

1. Introductory Seminar. Reading the text entitled "Tools"; Vocabulary and conversation exercises.
2. Materials and Containers. Reading, introducing new phrases, applicative exercises. Cardinal and Ordinal Numerals: Revision.
3. Shapes and Angles. Reading, introducing new words. The plural of nouns: Revision and exercises.
4. Engines (I). Text reading, vocabulary exercises. Countable and uncountable nouns (revision exercises).
5. Engines (II). Text reading, conversation. Number of invariable nouns (revision and exercises).
6. Engines and Fuels. Modal verbs - revision
7. Current, Voltage and Resistance. Text reading. The Present Tense Simple and The Present Tense Continuous (Revision and exercises).

8. Electrical Supply. Reading, Speaking. The Past Tense Simple and The Past Tense Continuous (Revision and Exercises).
9. Facts about matter. Listening and conversation. The Present Perfect versus The Past Tense
10. Circuits and Components. Reading and vocabulary exercises. The Present Perfect Continuous and The Past Tense Continuous.
11. Electrolysis. Reading and conversation based on the text. The Past Perfect Tense Simple and Continuous (Revision and Exercises)
12. Electrical Devices. Communication. Reading and expression of opinions.
13. Batteries. Methods of structuring and writing a descriptive essay. The complex verb "To call".
14. Revision: Cardinal and ordinal numerals, the plural of nouns, means of expressing the present and the past in English.

Physical Education and Sport I

1st year of study – 2nd semester (spring)

Special mathematics – Dorina FECHETE

1. First-order ordinary differential equations
   - Generalities
   - Separable equations
   - Euler homogeneous equations
   - Linear differential equations
   - Existence and uniqueness of solutions
   - Numerical methods for ordinary differential equations
2. Higher order differential equations
   - Generalities
   - Reduction of order
   - n-th order linear differential equations
   - n-th order linear differential equation with constant coefficients
3. Systems of linear differential equations
   - General properties
   - Solution formulas
4. Differential operators
5. Fourier series
6. Fourier transform
7. Laplace transform

Internet programming techniques – Răzvan ALBU

1. Web evolutions, from origins to Web 3.0 and IoT
2. ASP .NET (ASP controls, Web Forms)
3. Web services (SOAP and REST, configuring IIS web server)
4. Windows Communications Foundation (service contracts, hosting, running and consuming WCF services)
5. JavaScript (variables, constants, types, functions, arrays, operators)
6. NodeJS (NPM, Express, asynchronous programming)
7. AngularJS (TypeScript, components, Angular CLI, templates, directives, services, dependency injection)
8. Internet of Things

Material for electronics – Dorel HOBLE

1. Aggregate states of bodies. The crystalline structure.
2. Defects of crystalline networks.
3. Energy bands of the electron in the crystal.
4. Electrical conduction of metals.
5. Conduction of semiconductors.
6. Electrical polarisation.
7. Magnetization

8. Technical and technological properties of electric materials.
9. Conductive materials. Metals.
10. Semiconductors materials.
11. Gaseus and liquid insulating materials.
12. Solid insulating materials.
13. Magnetic materials.
14. Magnetic liquids.

Electronic devices – Adrian BURCA

1. Notions of semiconductor physics
2. The p-n junction. Characteristics.
3. Diodes. Characteristics.
4. Single-phase rectifiers
5. The bipolar transistor (I)
6. The bipolar transistor (II)
7. Polarization of bipolar transistors
8. Unipolar transistors (I). JFET's
9. Unipolar transistors (II). MOSFETs
10. Polarization of unipolar transistors
11. Transistor, low signal (I) amplification schemes
12. Transistor, low signal (II) amplification schemes
13. Multi-junction devices (I) Thyristor, Triac
14. Multi-junction devices (II) IGBT transistor

Fundamentals of Electrical Engineering I – Teodor LEUCA

1. Linear electric circuits in stationary regime
2. Non-linear electric circuits in direct current
3. Linear electric circuits in permanent sinusoidal regime

Computer programming and programming languages II – Sorin CURILĂ

1. Pointers.
2. From Structured Programming to POO
3. C++ classes
4. Objects instancing
5. Derivation relationship
6. Constructor and destructor functions in derivation relationship
7. Aspects of class behaviour
8. Polymorphism

Electronic Technology – Nicolae DRĂGHICIU

1. Current trends in electronic technology. Technical issues of electronic engineering, economical technical study, marketing study, design theme, electronic design
2. The technology for making resistors. Wound resistors technology, film resistor technology. Microminiature technologies of resistors. Reliability of resistors.
3. Capacitor design technology. Fixed, variable, adjustable, special capacitor technology. Reliability of capacitors.
4. Coil making technology. Conductive coil construction and technology for winding, coil housing. Types of windings, winding impregnation, core types, cores characteristics
5. Passive electronic component manufacturing technology of the SMD type.
6. Lithography and engraving techniques. Lithography. Photolithography technology. Engraving.
7. Semiconductor diode technology. Behavior of junction p-n, classification of semiconductor diodes. Dotted diodes. Diodes broadcast. Flat epitaxial diodes. Diode Schotty
8. Discrete transistor technology. Bipolar transistor technology. Field effect transistor technology.
9. Embedded circuit technology.
10. Technology of active electronic components of SMD type
11. Harness technology in electronics. Linking technology by soldering. Technology of printed circuits.

12. Technology of SMD components printed circuits. Making unprotected wiring harnesses.
13. Techniques for realizing electronic equipment that meets the requirements of electromagnetic compatibility and signal integrity.
14. Connect the electronic components. Adhesive conductors. Technologies for depositing conductive adhesives.

English language II – Simona ABRUDAN CACIORA

1. Properties of Engineering Materials (I). Reading and conversation. Paragraph building (Structure of a paragraph, linking words).
2. Ferrous Metals. Reading. Means of expressing the future (I)
3. Tensile Strength and Hardness. Reading of texts, means of expressing opinions. The Future Perfect.
4. Properties of Engineering Materials (II). Newspaper Articles The complex verb "To Fall".
5. Solders. Reading. The Infinitive (Revision and Exercises)
6. Speaking Practice. Complex verbs: "To Take". Conversation and means of expressing points of view. Exercises with complex verbs.
7. Mechanisms. Listening to English texts and conversations. The Gerund and the Participle (Review and exercises).
8. Forces in Engineering. Reading, introducing new phrases, argumentation exercises.
9. Writing: Listing and Enumerating Arguments (Enumerating and organizing arguments in a written text). Applicative exercises.
10. The Hovercraft. Text reading, conversation.
11. Changing the Structure of Information in a Sentence: The Passive Voice. Applicative exercises.
12. The Subjunctive Mood. Revision and exercises.
13. Electrical generators. Reading and expressing opinions
14. Revision

Physical Education and Sport II

2nd year of study – 1st semester (autumn)

Basic electronic circuits – Adrian BURCA

1. Reaction in Amplifiers (I)
2. Reaction in Amplifiers (II)
3. Features of amplifiers
4. Harmonic oscillators
5. RC oscillators
6. LC oscillators
7. Three-point oscillators with bipolar transistors
8. Three-point oscillators with unipolar transistors
9. Modulation
10. Demodulation
11. Voltage and current stabilizers
12. Protection of stabilizers
13. Switching circuits with discrete elements. bistable.
14. Switching circuits with discrete elements. monostable.

Digital integrated circuits I – Ovidiu NEAMȚU

1. Data in digital systems
2. Boolean Algebra
3. Logical gates
4. Logical circuits in TTL technology
5. Logical circuits in NMOS technology
6. Logical circuits in CMOS technology
7. Logical circuits in I2C technology
8. Validation circuits in the integration architectures
9. Karnaugh diagrams

10. Encoders and decoders
11. Multiplexers and demultiplexers
12. Analysis of Combined Logic Circuits
13. Synthesis of Combined Logic Circuits
14. Applications with logical integrated circuits

Computer aided graphics – Cristian GRAVA

1. Graphical systems
2. Systems of coordinates
3. 2D graphical transformations
4. Visualization transformations
5. Models of reflection and illumination

Computer aided graphics – project - Cristian GRAVA

1. Translation, rotation, zooming
2. Composed and inverse transformations
3. Parallel projections
4. Perspective projections
5. 2D inverse transformations
6. Textures generation

Signals and Systems I – Cornelia GORDAN

1. Generalities I. - Elementary signals defined in continuous and discreet time (signals: unitary step, ramp, signum, exponential, sampling function, unit impulse).
2. Generalities II. - Transformations of the continuous and discreet time variable; Signal energy and power
3. Periodic signals defined in continuous time I. - Fourier series (trigonometric, harmonic, complex); Defining amplitude and phase spectra.
4. Periodic signals defined in continuous time II. - Properties of the Fourier series (symmetry, linearity, Parseval theorem, Gibbs phenomenon, time shift, complex conjugation, reflection, scaling, modulation, derivation, integration, LMS approximation);
5. Periodic signals defined in continuous time III. - Convolution of periodic signals; Calculating the coefficients of the complex form of the Fourier series with the Dirac distribution; Correlation functions.
6. Aperiodic signals defined in continuous time I. - Fourier transform (definitions, conditions of existence, definition of spectra of amplitudes and phases, properties).
7. Aperiodic signals defined in continuous time II. - Laplace transform (definitions, conditions of existence, properties); Correlation functions.
8. Aperiodic signals defined in continuous time III. - Harmonic carrier modulated signals (in amplitude, frequency, phase); Definition of modulation coefficients, spectral content, useful band, actual value.
9. Periodic signals defined in discrete time. - Fourier series of discrete periodic signals; The properties of these Fourier series; Periodic convolution of discrete signals.
10. Transform. Fourier in discrete time. - Fourier transforms for discreet periodic and aperiodic signals; Properties of the Fourier transform in discrete time.
11. Discrete signals I. - Definition of sampled signals and direct and inverse Fourier transforms for them; The sampling theorem.
12. Discrete signals II. - Transformed z (definition of direct and inverse forms, domain of existence, properties).
13. Discrete signals III. - Modulated pulse bearer signals (amplitude, position).
14. Discrete signals IV. - Impulse carrier modulated signals (in frequency, duration, code, delta).

Fundamentals of Electrical Engineering II – Teodor LEUCA

1. Triple phase electric circuits
2. Linear electric circuits in non-sinusoidal periodic regime
3. The linear electric circuits in transient regime
4. The electromagnetic field in electrostatic regime

5. The electromagnetic field in the electro-kinetic regime
6. The electromagnetic field in the stationary magnetic regime
7. The general (fundamental) laws of the electromagnetic phenomena

Analog integrated circuits – Ioan GAVRILUȚ

1. Introduction. Parameters and characteristics of analog integrated circuits
2. Current sources. Voltage sources
3. Differential amplification stages
4. Output stages (final)
5. The ideal operational amplifier (AO)
6. Basic configurations with AO
7. Parameters of operational amplifiers
8. Internal structure of AO. Static errors
9. Dynamic behavior of AO
10. The summing amplifier circuit
11. Differential input amplifiers
12. Integration circuits. Derivation circuits
13. Precision rectifiers
14. Voltage comparators

Measurements in Electronics and Telecommunications – Marin TOMȘE

1. Introduction. Sizes and units of measure. Means and methods of measurement.
2. Measurement errors. Classification of errors. Mathematical analysis of errors. Random errors. Systematic errors. Processing results.
3. General characteristics of the measuring instruments. Block schemes. Static features. Behavior in dynamic mode. Constructive features.
4. Circuits for expanding the current measuring range. The simple shunt. Multiple shunt. Transformers for measuring current. Rogowski transducers.
5. Circuits for expanding the voltage measuring range. Additional resistor. Resistive, capacitive, inductive voltage dividers. Attenuators. Transformers for voltage measurement.
6. Electronic circuits used in measuring devices. Instrumental Amplifiers. Rectifier precision bialternance.
7. Converters for numerical measurements. Numeric-analog converters. Analog-numeric converters. Voltage-frequency converters.
8. Measurement of voltages and currents. Analogue ammeters. Electronic ammeters for measuring small and very small currents. Measuring high currents. Analog voltmeters. Electronic voltmeters. Numeric multimeters.
9. Measurement of electrical power. Measurement of active power. Measurement of reactive power.
10. Measurement of electrical energy. Counters
11. Measurement of resistances: volt-ampermetric method, ohmmeters, mega ohmmeters. Wheatstone bridge, double bridge, resistance-to-voltage converters.
12. Measurement of inductances and capacities. AC power bridges. General. Examples of AC bridges for capacitance and inductance measurements.
13. Measurement of frequency, period and phase-out. Analog and numerical methods for frequency, period and phase measurement.
14. Measurements of amplitude and frequency modulated signals.

English language III – Simona ABRUDAN CACIORA

1. Introductory Seminar. Reading the text entitled "An Introduction to Computers"; Vocabulary and conversation exercises.
2. First Approach to Software. Reading, introducing new phrases, applicative exercises. Cardinal and Ordinal Numerals: Applications.
3. The Computers and their Processing Abilities. Reading, introducing new words. The plural of nouns: Revision and exercises
4. Major Computer Applications. Reading, vocabulary exercises. Countable and uncountable

nouns (revision exercises).
5. Computers and Algorithms. Text reading, conversation. The number of invariable nouns (revision and exercises).
6. Human Intelligence vs. Artificial Intelligence. Text reading.
7. Computer Ergonomics. Text reading. Modal verbs (revision).
8. Levels of Intelligence. Reading, Speaking.
9. Lasers. Listening and conversation.
10. Uses of Ultrasound. Reading and vocabulary exercises.
11. The Electronic Brain. Reading and conversation based on the text.
12. Online communication: Internet and IT Vocabulary. Writing e-mails.
13. Robots. Reading of texts, expressing opinions.
14. Revision.

Physical Education and Sport III

2nd year of study – 2nd semester (spring)

Object oriented programming – Sorin CURILĂ

1. Object Oriented Programming
2. C++ classes
3. Association-aggregation-derivation
4. MFC Programming
5. MFC Menus
6. MFC Dialog boxes
7. Properties sheets
8. Wizard
9. Values oriented controls. Evolution bar
10. Sliding button
11. Incremental control
12. Serializing data structures

SPICE models – Adrian ȘCHIOP

1. Programs for simulation of circuits
2. The standard definition of electronic components for SPICE and viewing the results
3. Creating and editing components
4. Generating electronic schemes for OrCAD PSpice simulation
5. Types of analysis in PSpice
6. Creating footprints
7. Transfer Techniques SCM – PCB

Signals and Systems II - Cornelia GORDAN

1. Passive electrical filters I. - General; Constant type K filters (general analysis).
2. Passive electrical filters II. - Constant type K filters (low-pass, up-and-down, bandwidth, stop-tape structures).
3. Passive electrical filters III. - Derivative m filters (generalities, m series and parallel derivations, low-pass, up-pass, band-pass structures).
4. Passive electrical filters IV. - Deck filters (generalities, low-pass, over-the-top, pass-band structures).
5. Active electrical filters I. - General; Voltage transfer functions (Butterworth, Cebisev, Bessel, Paynter, etc.).
6. Active electrical filters II. - Simple single-action active filters (generalities, low-pass, over-pass, band-pass structures).
7. Active electrical filters III. - Multiple-response active filters (generalities, low-pass, over-pass, cross-band structures).
8. Active electrical filters IV. - Active second order filters with ordered voltage source (generalities, low-pass structures, pass-over, band-pass).
9. Digital Filters I. - Generalities; Conversion of systems over time into systems in discrete time.

10. Digital Filters II. - Recursive filter structures.
11. Digital Filters III. - Non-recursive filter structures.

Numerical methods – Mihaela NOVAC

1. Matlab programming fundamentals.
2. Introduction in Matlab programming
3. Errors in numerical calculation (sources of error, absolute and relative errors, error propagation, measurement errors).
4. Numerical methods to solve algebric linear systems equations. Exact methods. (Gauss's elimination method, the inverse matrix method, the Gauss-Jordan method, LU factorization method.)
5. Numerical methods to solve algebric linear systems equations. Iterative methods. (The iterative method of Jacobi. Gauss-Seidel iterative method. Successful relaxation method).
6. Numerical methods to solve nonlinear equations (Bisect method, sequence method, false position method, resolution of nonlinear equation systems).
7. Interpolation (Lagrange interpolation polynomial, finite differences and generalized powers (Newton-Gregory polynomials with finite differences), Newton's divided differences formula, Spline functions).
8. Functions approximation (functions approximation using least squares method).
9. Numerical integration (Trapezoidal method, Romberg method, Simpson's method).
10. Numerical derivation (numerical derivation formulas using Taylor series expansion).
11. Numerical methods to solve differential equations (Euler's method, Milne's method, Runge-Kutta method).

Digital integrated circuits II – Ovidiu NEAMȚU

1. Sequential logic circuits
2. Flip-flops type RS
3. Flip-flops type Master-Slave JK
4. D-type and T-type flip-flops circuits
5. Asynchronous counting
6. Synchronous counting
7. High capacity integrated counting
8. Registers
9. Parallel-serial and serial-parallel data converters
10. Monostable circuits
11. Memory circuits: ROM, PROM
12. RAM random access memories
13. Programmable clock circuits
14. Integrated circuits in dedicated applications

Electronic Instrumentation for measurement – Marin TOMȘE

Presentation of basic operating principles of electronic measuring and control devices.

1. Getting Started. Principles of realization of electronic measuring instrumentation. Classifications.
2. Measuring transducers used in measuring instruments. Classification. Resistive transducers. Measuring transducers. Capacitive transducers. Inductive transducers. Generating transducers: thermoelectric, galvanomagnetic, photoelectric, piezoelectric.
3. Signals and instruments for generating signals. Classifications. Periodic signals. Modulated signals. Sinusoidal Signal Generators. Analog function generators. Function Generators with Digital Synthesis.
4. Tools for viewing and recording signals over time. Analog oscilloscope. Block schema. Characteristic dimensions. The cathode tube. Vertical deviation block. The time base. The deviation block on the horizontal. Oscilloscope probes. Numerical Oscilloscopes. Classification. General structure. Sampling techniques used in numerical oscilloscopes. Circuits specific to numerical oscilloscopes. Reconstitution of the samples from the samples taken. Characteristic parameters of numerical oscilloscopes. Numerical oscilloscope facilities.

5. Numerical measurement of voltages and impedances. Vector voltmeters. Voltmeters based on the effect of electromagnetic fields on light. LCR-numeric meter.
6. Spectrum Analyzers. Principles of operation. Spectral analysis by heterodination. Selective voltmeter. Tracking generator. The wobble. Fourier Analyzer.
7. Electronic instrumentation with microprocessor. General structure. Uni and multiprocessor structures. Functions of uP in measurement instrumentation. Testing and calibration.

Theory of Information transmission – Lucian MORGOȘ

1. Introduction to Probability Theory. Random experiment, events. Probability of an event. Random variable. Probabilities of a random variable. Conditional probabilities. The concept of statistical independence. Numerical signals as random variables.
2. Source of information. Information. Definitions and notations. Units of measurement for information. Mutual information of two events.
3. Discrete information sources. Definitions and notations. Classification of discrete sources. Markov sources. Description of Markov sources through state diagrams.
4. Entropy of discrete sources of information. Source entropy without memory. Properties of entropy. Entropy of the binary source. Entropy of Markov source. Decorrelation of Markov source
5. Flow, redundancy, relative redundancy.Conjugated entropy of two sources of information. Mutual information of two sources. Conditional entropy of the source of information. Relationships between entropy (Venn Charts).
6. Channels for transmitting information. Channel classifications. Discrete channels for the transmission of information. The capacity of the discreet channel.
7. Discrete channel models. Channel uniformly towards the entrance. Channel uniformly towards the exit. Symmetric channel. Examples of discrete channels. Binary symmetric channel. Binary channel with errors and cancellations.
8. Information sources and continuous channels. Entropy of the continuing information source. The significance of the entropy of a continuous source. Fundamental inequality in the case of continuous distributions. Cases of maximum entropy. Variation of entropy with change of signal representation space.
9. Continuous channels for the transmission of information. Mutual information in continuous channels. Mutual information properties in continuous channels. Continuous channel capacity.
10. Source coding. Classification of source codes. Instant or irreducible codes. Absolutely optimal codes. Optimal codes. Capacity, efficiency and redundancy of codes. Expanding a source of information. Shannon's first Theorem.
11. Algorithms of entropic coding. Shannon-Fano coding. Coding Huffman. Arithmetic coding.
12. Channel encoding. The probability of decoding error. Coding by repeating symbols. Shannon's 2nd theorem. The space of words. Graphic representation of words. Hamming distance. Detecting Errors and Correct Errors. Specifying meaningful words.
13. Correction Codes / Error Detectors. Group codes. Coding. Decoding. Relationships between columns of the control matrix H. Correction Hamming code group of an error.
14. Cyclic codes. Representing codewords as polynomials. The space of the words. Multiply the decomposition classes modulo p (x) = xn +1. Specifying meaningful words. Coding. Decoding. Coding using polynomial h(x). Coding using matrix computation.

English language IV - Simona ABRUDAN CACIORA

1. Introduction: The structure of organizations and company.
1.1 The presentation of job titles.
1.2 Forms of Business Organization: Sole traders, partnerships, joint stock companies, private limited companies, public limited companies
1.3 Reading a conversation about career developments.
2. Discussion group: Assessment and evaluation of jobs. Task: Drawing an organization-chart, describing your job and your company
3. Understanding the organizational culture.
3.1 Reading about the international economic and the business environment

3.2 Leadership styles
3.3 The values of the organization.
3.4 Types of property in the USA and in Great Britain;
3.5 The Anglo-Saxon measurement system.
4. Role play: The dress code and behaviour standards.
5. Professional ethics 5.1 Professional ethics 5.2 International business ethics: specific vocabulary
6. Speaking Practice. Case-study: Talking about franchise opportunities.
7. Presentations: Types of presentations – Sales presentations, Informal presentations, Briefings, etc
8. Practices and techniques aimed to improve the students' telephoning skills: presentation, questions, demands, wishes.
9. Telephoning. Useful phrases: Getting connected, making requests, arrangements, offers, complaining, dealing with complaints..
10. Organizing effective meetings
10.1 Vocabulary related to planning and facilitating business meetings
10.2 Scheduling business meetings
10.3 Invitation1samples
10.4 Greeting and welcoming people
10.5 Chairing a business meeting.
11. Role-play: Organizing a business meeting.
12. Online communication.
12.1 Internet and IT Vocabulary
12.2 Writing e-mails.
12.3 Video-conferencing.
13. Discussion group: Theme – The evolution of online communication and its impact upon the business environment
14. Revision.

Physical Education and Sport IV

3rd year of study – 1st semester (autumn)

Industrial Electronics – Daniel TRIP

1. Introduction. Power electronic devices – overview.
2. Single phase rectifiers with resistive load. Conversion efficiency.
3. Controlled rectifiers. Three phase rectifiers.
4. Rectifiers with resistive – inductive load.
5. PWM rectifiers. Filtering circuits.
6. Voltage regulators. IC voltage regulators.
7. Voltage regulators family 78xx. Applications.
8. Switched mode power supplies. Introduction.
9. DC-DC Buck converter.
10. DC-DC Boost and Buck-boost converters.
11. DC-DC Forward and Fly-back converters.
12. Power factor correction circuits. Uninterruptible power supply.
13. PWM Inverters.
14. Resonant conversion of electric energy.

Industrial Electronics – project – Daniel TRIP

1. Design of power conversion equipment: rectifiers, switching mode power supplies, regulators etc. in the field of industrial electronics. Basic concepts. Presentation of the design stages and designing themes.
2. Design of coils and transformers on ferrite core.
3. Design of rectifying and filtering circuits.
4. Design of control circuits for electronic power devices.
5. Design of protection circuits.

6. Design concepts for printed circuit boards and radiators for electronic power supplies.
7. The way to elaborate and present the content of the project

Nano and micro technologies for electronics – Liviu MOLDOVAN

1. Introduction
2. Silicon. Physical and chemical properties. Manufacture of silicon wafers
3. Silicon wafers cleaning techniques. Good cleanroom practices
4. Photolithography (what it is, what it uses, what are the properties of the photosensitive resin, how to obtain different cross section profiles)
5. Electronic lithography (what it is, how it is used, how to use electronic scanning microscope in electronic lithography, what are the properties of PMMA, what are the advantages and disadvantages of photolithography)
6. Dry etching (what is plasma, principles of plasma etching, choice of gases depending by the material to be etched)
7. Wet etching (how to use acids and bases for wet etching, wet etching principles, choice of acids or bases depending by the material to be etched)
8. Oxidation (physical and chemical phenomena occurred in the oxidation process, types of oxidation, conditions necessary to use oxidation during a technological process)
9. Semiconductors doping (physical and chemical phenomena involved in the doping process, types of oxidation, conditions necessary to use oxidation during a technological process)
10. Vapor deposition and chemical deposition (evaporator operating principle, conditions for choice of vaporization or chemical deposition, commonly used materials).
11. Molecular beam epitaxy (principle of epitaxial growth, functioning of devices necessary for epitaxial growth, measures to prevent contamination with impurities, techniques for a suitable vacuum)
12. Geometric characterization techniques (Profile characterization using dektak, electron microscopy and ellipsometry measurements)
13. Electrical characterization techniques (four point method)
14. Nano-Impression Techniques

Fundamentals of data acquisition systems – Alexandru GACSÁDI

1. Introduction to data acquisition systems (DAQ); basic components of the data acquisition and control systems (transducers – sensors and actuators).
2. Sampling and signal reconstruction; binary codes.
3. Analog signal conditioning circuits; analog switches and multiplexers.
4. Amplifiers; operational amplifier; instrumentation amplifier; programmable-gain amplifiers; isolation amplifiers.
5. Sample and hold circuit; characteristics and implementation.
6. Digital-to-analog converter (DAC); characteristics of DAC.
7. Digital-to-analog converter types.
8. Analog-to-digital converter (ADC); characteristics of ADC.
9. ADC architectures; direct-conversion (pipeline) ADC; successive-approximation converter; counter type ADC.
10. Data acquisition and distributions system architectures; fundamental structures for one ore multichannel analogue inputs; multiplexed and simultaneous DAQ.
11. Standard communication interfaces; RS-232.
12. Standard interfaces; I2C; IEEE-488.
13. DAQ application example for slow processes.
14. DAQ application example for fast processes.

Digital Signal Processing – Sorin CURILĂ

1. Signals and systems
2. Convolution of discrete signals
3. Correlation of discrete signals
4. Fourier transform.
5. Z transform.

6. Own Vectors - own values.
7. Orthogonal unit transformations.
8. Rectangular transformations.
9. Transformations based on own vectors.
10. Wavelet transform

Telecommunications Devices – Cornelia GORDAN

1. Adaptation, attenuation, reflection
2. Working parameters of passive two-ports
3. Attenuation circuits - Generalities. Different schemes, design methods, operating parameters.
4. Adaptation Circuits - Generalities. Different schemes, design methods, operating parameters.
5. The principle of switching capacity. Analysis and design of active filters with switched capabilities.
6. Design of digital filters IIR - Common methods and methods of analysis and design. Schemes, features, operating parameters.
7. Design of FIR digital filters - Common methods and methods of analysis and design. Schemes, features, operating parameters.
8. Generate and detect amplitude-modulated signals
9. Generate and detect frequency-modulated signals
10. Mixers
11. Multiple access techniques I: with frequency and time division.
12. Multiple access techniques II: with code and space division.

Microprocessors and Microcontrollers – Daniel TRIP

1. Introduction. Microprocessors and microcontrollers overview.
2. Data format for microprocessors and microcontrollers.
3. Intel 8086 microprocessor. Architecture of Intel 8086 microprocessor.
4. Demultiplexing of the external bus. Writing and reading cycles. Interrupt system.
5. Modern architectures of microprocessors. New operation concepts of the new microprocessors.
6. RISC architecture. Roles of the microcontrollers.
7. Example of microcontroller architecture. Main resources of a general purpose microcontroller.
8. Microcontrollers ports. Port initialization and use. Electrical specifications.
9. Interrupt system at microcontrollers.
10. Timers and serial ports at microcontrollers.
11. ADC and CCP (PWM) modules at microcontrollers.
12. General design concepts of circuits based on microcontrollers.
13. Implementation and programming concepts for circuits based on microcontrollers.
14. Applications. Implementation examples.

Microprocessors and microcontrollers – project - Daniel TRIP

1. Presentation of the main concepts regarding the use of microcontrollers. Basic concepts. Presentation of the design stages and designing themes.
2. Implementing a logical diagram for an application based on the requirements and facilities offered by the microcontroller.
3. Designing the application's electronic circuit using a microcontroller.
4. Circuit implementation on a test board or use a development / test board. Implementing the application algorithm.
5. Programming and testing the application.
6. Design concepts for printed circuit boards based on microcontrollers.
7. The way to elaborate and present the content of the project

Radiocommunications – Daniel TRIP

1. Introduction. RF spectrum used in radio communications. Legislative framework and national / international organizations which manage the radio spectrum and regulates the radio communications.
2. Maxwell equations in local and integral form.

3. Plane wave equation. Plane wave propagation.
4. Plane wave propagation through a separation surface of two different environments. Metallic screening.
5. Transmission and reflex of a plane wave in a point on the separation of two different environments.
6. Antennas. Antenna design parameters. Directivity characteristics.
7. Radio waves propagation.
8. RF oscillators.
9. PLL. Frequency synthesis.
10. DDS circuits.
11. RF mixers.
12. Impedance matching circuits.
13. Radio receivers.
14. Radio transmitters.

Industrial management – Marius ROMOCEA

1. Introduction in management science
2. Concept and content of environmental factors
3. Planning as a process
4. Organizational and competitive strategies
5. Planning in the enterprise
6. Planning in the research and development function
7. Planning in the production function
8. Human resources planning
9. Organization in the industrial enterprise
10. Departments in industrial enterprise
11. Job analysis
12. Control in the industrial enterprise

3rd year of study – 2nd semester (spring)

Reliability – Ovidiu NOVAC

1. Introduction
2. Basic concepts of reliability. Reliability parameters. Modeling of equipment wear
3. Basic concepts of reliability. Maintainability. Maintenance. Availability.
4. Basic concepts of reliability. Distribution Laws
5. Reliability Models. Functional model. The logical model. Markov models and block diagram of reliability. Markovs matrix formulation
6. Reliability models. Applications to composite systems. Model of the failure shaft
7. Tolerance equipments to faults. Introduction. Algorithms for detection and diagnosis of failures
8. Tolerance equipments to faults. Redundant structures for implementing fault tolerance
9. Technics to improve reliability and availability. Methods of generating test sequences used in defect diagnosis. Testing methods.
10. Techniques to improve reliability and availability. Self-checking equipment. Methods of providing easy testability.
11. Techniques for improving reliability and availability. Specific problems of fault tolerance implementation techniques. Techniques to reconfigure equipment when malfunctions occur.
12. Reliability of electronic devices and computing systems. Introduction. Design of electronic devices and computing systems.
13. Reliability of electronic devices and computing systems. Reliability of programs.
14. Reliability tests

Television - Alexandru GACSÁDI

1. Basics of color television.
2. Television systems. The TV principle.
3. Linear scanning and interlaced scanning; resolution.

4. The composite color television video signal.
5. The characteristics of the video signal; time and frequency representation; the frequency spectrum.
6. The structure of a compatible color TV system.
7. The PAL color television system; quadrature amplitude modulation, composite PAL color video signal.
8. The PAL color television system; PAL encoder block diagram; PAL decoder block diagram.
9. Integrated video cameras; image sensors; charge coupled devices (CCD)
10. Display devices for television; video display monitors.
11. TV transmission; broadcasting, cable TV broadcasting, satellite TV.
12. Analog-digital television systems.
13. Digital Television (DTV); Digital Video Broadcasting; DVB-T System
14. Digital Video Broadcasting; DVB-C System; DVB-S System;

Image Processing and Analysis – Cristian GRAVA

1. Image digitization
2. Images' spatial representation
3. Images' spectral representation
4. Image enhancement
5. Linear and non-linear image filtering
6. Mathematical morphology applied in image processing
7. Image segmentation
8. Image compression

Microwaves – Liviu MOLDOVAN

1. Main theoretical aspects of electromagnetism. Maxwell's equations Classification of electromagnetic waves.
2. Wave–particle duality. Flat electromagnetic waves. Electromagnetic waves directed between conductive surfaces
3. Microwave Engineering Modes of Propagation. Waveguides modes. Wavelength and the Wave Impedance
4. Transverse Electromagnetic Wave. Transverse Electric Wave. Transverse Magnetic Wave. Hybrid Wave
5. Multi-conductor Lines. Co-axial Lines. Strip Lines. Micro Strip Lines. Other Lines.
6. Electromagnetic Waveguides. Transmission Lines Vs Waveguides.
7. Smith chart.
8. Reflex Klystron. Construction of Reflex Klystron. Operation of Reflex Klystron. Applications of Reflex Klystron
9. Travelling Wave Tube. Construction of Travelling Wave Tube. Operation of Travelling Wave Tube. Applications of Travelling Wave Tube.
10. Magnetrons. Cavity Magnetron. Construction of Cavity Magnetron. Operation of Cavity Magnetron with Active RF Field.
11. Microwave Amplifiers (stability of microwave transistor amplifiers, power amplification, amplifier noise, microwave transistor polarization aspects, semiconductor microwave amplifiers). Microwave oscillators.
12. Antennas and propagation of electromagnetic waves.

Nano and Microtechnologies for electronics – Project – Liviu MOLDOVAN

1. The steps of the realization of a project in nano and micro technologies
2. The steps of a concrete project theme
3. The proposal of a succession of technological processes
4. Determining of alternative methods of project realization
5. Establishment of the chosen method according to advantages and disadvantages
6. Defending the project

General Economics – Constantin RADA

1. Subject of general economics

2. Law character of economics
3. Economical activity
4. Economical needs and interests
5. The enterprise
6. Consumer behavior
7. The market
8. Economic competition
9. Selling prices
10. Consumption and savings
11. Economic growth
12. Entrepreneur's profit
13. Cyclicality of economic activities
14. Relations with the international market

Information Compression and Coding – Ioan BUCIU

1. Basics for image and video processing and representation.
2. The Human Visual System and its connection to image representation and compression.
3. Data correlation. Decorrelation and data redundancy removal.
4. Fourier Transform and Discrete Cosine Transform with application to image compression.
5. Principal Component Analysis and its application to image compression.
6. Methods for image quality comparison and coding elements.
7. Motion compensation methods.
8. Basics of Information Theory. Huffman coding and decoding. Arithmetic coding and decoding. The LZW code.
9. JPEG standard.
10. Sub-band image decomposition, wavelet transform and JPEG2000 standard.
11. Audio compression. Principles and Methods. The MP3 and AAC standard.
12. Fundamentals of MPEG – 2 and MPEG – 4.

Information Compression and Coding - Project – Ioan BUCIU

1. Information coding using Lempel – Ziv method.
2. Huffman coding and decoding.
3. Image compression via HAAR wavelet transform.
4. Image decomposition using multi-resolution wavelets.
5. LPC (linear predictive coding) based audio compression.
6. Audio compression with sub-band methods.
7. MP4 audio compression.

Computer Architecture – Ovidiu NEAMȚU

1. Block structure of PCs
2. Soft driver for electronics management on the motherboard
3. Communications between internal components of PC systems
4. Chipset in the architecture of the evolved PC systems
5. External communications with other PC systems
6. Software configurations for direct electronic actions in Matlab-Simulink
7. Intel's internal processor architecture
8. Complex instructions integrated into modern processors
9. Magnetic storage units
10. Optical storage units
11. High capacity electronic storage units
12. Graphical interface
13. Applicative extensions for a computer
14. Maintaining hardware and software integrity of PC systems

4th year of study – 1st semester (autumn)

Digital Signal Processors – Daniel TRIP

1. Generalities about digital signal processors. Harvard architecture.
2. Representing data in digital signal processors.
3. State-of-the-art in numeric signal processors in floating point and floating point. General and specific features.
4. Configuring and Addressing Memory.
5. Arithmetic and logic unit.
6. Working in "pipe-line" technique.
7. Instructions and instruction blocks that repeats them.
8. Status and control registers. Interrupt system.
9. I / O ports. Pins of general use. Timing circuits. Serial communication ports.
10. Using ADC and PWM modules on signal processors.
11. General concepts regarding the implementation of signal processing algorithms.
12. Implementation of FIR type numeric filters.
13. Implementation of IIR type filters.
14. Implementing a PWM control circuit with signal processor.

Telecommunications software – Ioan BUCIU

1. Protocols and standards for Internet Communications – TCP/IPv4, IPv6, Ethernet, UDP.
2. Serial data communications protocols – I2C, SPI, UART.
3. Wi-Fi standards and security.
4. ZigBee technology.
5. RFID and NFC principles and methods.
6. Classic Bluetooth and BLE standard.
7. Internet of Things (IoT).
8. Voice over IP (VoIP). The H.323 standard.
9. Virtual Private Network (VPN).

Telecommunications software - Project – Ioan BUCIU

1. Virtual Private Network Settings
2. Configuring a VoIP system
3. LED wireless control using ZigBee Technology.
4. IoT – Temperature sensor, motion sensor and cloud technology for XBee remote communication.

Networks and services – Ovidiu NEAMȚU

1. International standards for digital telecommunication on integrated networks.
2. Narrowband ISDN services.
3. Broadband ISDN services.
4. ISDN electronic equipment
5. Private Branch Exchange - hardware structures.
6. Software for Private Branch Exchange
7. Electronic devices for ADSL (Asymmetric Digital Subscriber Line, VDSL Very high speed Digital Subscriber Line
8. VoIP Private Branch Exchange .
9. Electronic equipment for telecommunication in digital integrated networks on the Internet.
10. Integrated i telecommunication services on wired digital networks.
11. Integrated i telecommunication on Optical Fiber
12. Integrated i telecommunication on power lines
13. Modern communications for home systems under international standards.
14. Integrated communications for electronic monitoring of intelligent sensors

Networks and services – Project - Ovidiu NEAMȚU

1. ISDN equipments
2. Private Branch Exchange
3. Private Branch Exchange on computer networks
4. Electronic equipment for telecommunication in integrated networks.
5. Communications for electronic monitoring.

6. Telecommunications on integrated wireless networks.
7. Integrated communications for energy metering on the Internet

Techniques and switching systems – Lucian MORGOȘ

1. Overview of the fixed telephony network. Evolution of classical telephone networks to ISDN networks. General aspects and definitions related to telephone networks.
2. Analog / digital conversion in the digital phone systems. Primary PCM multiplex. Structure of European PCM (E1) and American PCM (T1) frames.
3. Transmission and frame synchronization E1 and T1. Alarms associated with frames E1 and T1. The co-directional and contra-directional interfaces and the associated signals.
4. The signaling systems in the telephone networks. Basic Aspects, Classification, Signal Charts corresponding to signaling on subscriber lines and trunk.
5. Signaling system SS7. Elements and architecture of the SS7 system. Signal diagrams corresponding to signaling on trunk lines.
6. Signaling system SS7 (continued). The pattern and the layers of the SS7 protocol. Data packets corresponding to the SS7 protocol and transmission of these packages.
7. Narrowband ISDN networks. Characterization, advantages, access techniques, transmission frame formats.
8. Digital access techniques in the telephone network (DSL access techniques). General aspects. Characteristic distortions of subscriber loops. SDSL access techniques. CAP Modulation.
9. Digital access techniques in the telephone network (continued). ADSL and VDSL access techniques. DMT modulation. New ADSL (ADSL2, ADSL2 +) and VDSL (VDSL2) techniques.
10. Types of digital signals. Multiplexing plesiochronous digital signals- positive and negative doping techniques. PDH multiplexing hierarchy. Frame synchronization and doping signaling.
11. Overview of Synchronous Digital Hierarchy (SDH). Structure and SDH sections. Transmitting tact between the nodes of a synchronous network. Synchronous networks architectures.
12. Multiplexing techniques used in the SDH system. Procedures for mapping plesiochronous affluents in SDH multiplexing and transport structures.
13. Characterization of "overhead" information used to control and manage SDH networks. Pointers and pointer operations in the SDH system. The reference model of SDH equipment.
14. Introduction to VoIP technology. General aspect, data formats, signaling.

Techniques and switching systems - Project - Lucian MORGOȘ

1. Installation call center
2. Programming call center
3. Configure network trunks
4. Definition, interior configuration
5. Terminal installation and configuration
6. Restrictions on trunks and interiors
7. Central connection to external networks - various operators

Virtual instrumentation for electronic systems – Marin TOMȘE

1. Getting Started. Virtual Instrumentation. General principles. Software for Virtual Instrumentation.
2. Introduction to LabVIEW. Elements in LabVIEW.
3. Creating, editing and debugging a virtual tool.
4. Creating virtual sub tools
5. Functions for scaling values
6. Own menus and element design
7. Programming structures
8. Functions for vector values. Cluster data.
9. Graphic representations
10. Virtual instruments for the acquisition and generation of signals
11. Internet communications in LabVIEW. Call LabVIEW applications from web pages
12. Virtual Instrumentation with VEE-Agilent
13. Virtual Instrumentation with dSPACE

14. Practical problems of interfacing virtual instruments

Communications Protocols – Romulus Reiz

1. Getting Started with Computer Networks
2. Protocol concept, protocols stack - Standardization of communication protocols. The ISO / OSI stratified network model.
3. TCP / IP protocols suite. Internet protocol. IP addresses and Internet addresses.
4. Addressing protocols (ARP, RARP, BOOTP, DHCP). Internet connection methods. DNS - Domain Name System.
5. TCP / IP model Physical level - Ethernet; ISDN; Modems; PLC; SONET / SDH; G.709; Wi-Fi
6. TCP / IP Model Data Link Layer - ATM; DTM; Ethernet; FDDI; Frame Relay;
7. TCP / IP Model Data Link Layer - IP (IPv4; IPv6); ICMP; IGMP; RSVP; IPsec
8. TCP / IP model Transport level - TCP; UDP; DCCP; SCTP; GTP
9. TCP / IP Model Application Level - DHCP IMAP4; IRC; NNTP; XMPP ;; AND P; SMTP; SNMP; SSH; BGP; PRC; RTP; RTCP; TLS / SSL SDP; SOAP; L2TP; PPTP
10. Networking applications on the Internet I - Accessing TELNET terminals; Transferring FTP files,
11. Internet network applications II - Electronic mail (e-mail); SMTP and MIME
12. Internet networking applications III - Web access via HTTP; DNS Service
13. Internet Network Applications IV - Voice over Internet and multimedia support
14. Getting HTML - Creating a web page in HTML language

Techniques and multiplex transmission systems – Sorin POPA

1. Introduction, Radio Frequency Spectrum. Legislative framework. Regulatory Authority.
2. Propagation of electromagnetic waves. Maxwell's equations, flat wave.
3. Propagation of the plane wave in the real environment. Influence of the land surface on propagation.
4. Propagation of radio waves in the environment. Influence of atmosphere and ionosphere on propagation.
5. Propagation characteristics according to wavelength.
6. Types of transmission lines. Adaptation of impedance.
7. Antennas generalities. Dipol elementar. Electrical parameters of the antennas.
8. The symmetrical dipole. Balancing.
9. Wavelength antenna y/2 (Yagi).
10. Horn Antenna (Waveguide).
11. Parabolic reflector antennas. Constructive features.
12. Plate antenna (microstrip).
13. Multiplex systems. Characteristics, standards.
14. Transmit and receive RTV signals in multiplex systems

4th year of study – 2nd semester (spring)

Mobile networks – Sorin POPA

1. Mobile communications. Introduction.
2. Characteristics of the radio channel. Manifestations of fading
3. Cellular mobile networks. Overview
4. Propagation models, prediction methods: Okumura, Hata, Lee etc.
5. Assign channels to a cellular network.
6. Determine the number of cells in a reuse area. Overlapping cellular networks
7. The principle of reuse of frequencies.
8. Multiple Access Techniques: TDMA, FDMA, CDMA, OFDMA.
9. Modulation procedures. Modulation of GMSK transmission, reception.
10. Mobile communication system GSM topology, features.
11. Performance parameters and evolution of the GSM system.
12. GSM mobile communication system BTS equipment.
13. Mobile communication system GSM interface and GPRS architecture.
14. Developing UMTS system features, architecture

Neural Networks – Romulus REIZ

1. Introduction – Artificial Neural Networks. Definition. Properties. Biological neuron. Artificial Neuron
2. Preceptron neural networks I – Simple perceptron ADALINE network. LMS algorithm.
3. Preceptron neural networks II. Multilayer perceptron. Training algorithm.
4. Perceptron neural networks III – fast training algorithms for feedforward networks.
5. Radial basis founction networks. Interpolation. Learning strategies
6. Recurrent networks – Hopfield networks.
7. Self organizing networks I – Hebbian learning.
8. Self organizing networks I - Competitive learning. SOFM algorithms.
9. Hybrid intelligent systems I – genetic algorithms, evolution strategies
10. Hybrid intelligent systems II – Hybrid neurogenetic systems, fuzzy logic systems, neuro-fuzzy systems.
11. Hybrid intelligent systems III - Learning by hardening, specific algorithms: value-based methods, dynamic programming methods, Monte Carlo methods
12. Implementation of neural networks - Software implementation. Hardware, analogue and digital implementation, hybrid implementations
13. Neural Network Applications I - XOR Issue, Parity Issue, Coding Problem.
14. Applications of Neural Networks II - Synthesis of Speech. Automatic speech recognition. Face Detection.

Communications and Internet architectures – Romulus REIZ

1. The architecture of computer networks. Internet history
2. Standardization of computer networks
3. IEEE 802.3 standard: Ethernet, Fast Ethernet, Giga Ethernet
4. IEEE 802.5 standard: Token-Ring token networks
5. ISO 9314: FDDI networks
6. IEEE 802.11: WLAN Networks. Bluetooth technology.
7. Network equipment. General aspects of installing a computer network. Cables and connectors
8. Physical-level equipment. PoE - Power over Ethernet. Multiport Repeaters (Hub)
9. Data link level equipment. Telephone and broadband modems.
10. Switches. Bridges
11. Network equipments (Router).
12. Security Equipment (Firewall).
13. Routing packages. Routing protocols.
14. Routing algorithms

Practice for diploma project development -

Optical Communication – Sorin POPA

1. Introduction. The fundamental problem of communications
2. Medium of Transmission - Constraints
3. Optical Fiber. Optical fiber communication links.
4. Optical Transmitter
5. Fiber optic cable
6. Optical receiver
7. Advantages of Fiber Optic Cable as Transmission Medium.
8. Elements of optical fiber construction and topology
9. Protective Fiber Optic Cover
10. Construction of fiber optic cables
11. Connectors
12. Junction
13. Measurements in optical fiber. Analysis of joint performance.
14. Expanding fiber optic bandwidth by multiple users

Encryption Algorithms for Telecommunication Networks – Laviniu ŢEPELEA

1. History of Cryptography. Cryptographic terminology.
2. Caesar Cipher. Polyalfabetic substitution ciphers. Vigenere cipher.
3. The OTP algorithm (One Time Pad). The SEAL algorithm.
4. Types of algorithms in modern cryptography.
5. Data Encryption Standard (DES) cipher.
6. Advanced Encryption Standard (AES) cipher.
7. The Blowfish algorithm. Symmetric string-like algorithms. RC4 cipher.
8. Algorithms with public keys. The Diffie-Hellman algorithm. RSA cipher.
9. Digital signature. Applying it to different types of documents.
10. Steganography. Applying steganography to different file types.
11. Using cryptography in e-commerce.
12. RFID techniques. Cryptography for cards.
13. Encryption in the Wireless domain. WEP, WPA, WPA2 encryption.
14. Security in Computer Networks. Computer attacks.

Telecommunication Equipments Testing – Ioan GAVRILUŢ

1. Overview about telecommunication equipment testing (Introduction. Types of defects)
2. Testing equipment (Logical analyzers. Signature analyzers. Testing of data converters. Equipment for automatic testing)
3. Testing of telecommunications networks (Introduction. Structure of the test generator. Structure of the error detector. Testing of the regenerations.
4. Testing the functional parameters of the radio receivers (Super-heterodyne radio receivers. Measuring devices and accessories. Functional parameter testing methods)
5. Testing the functional parameters of the TV receivers (Concepts used in television. Determining the characteristics of the TV receivers).