

# INFORMATION TECHNOLOGY (2018 - 2019 academic year)

## 1<sup>st</sup> year of study – 1<sup>st</sup> semester (autumn)

### Linear algebra – Ioan FECHETE

1. Preliminaries (Sets, relations, functions, algebraic structures)
2. Matrices, determinants, systems of linear equations
3. Vector spaces. Properties and examples
4. Basis and dimension of a vector space
5. Change of basis of a vector space
6. Subspaces
7. Linear transformations. Definitions and properties
8. Matrix of a linear transformation
9. Eigenvalues and eigenvectors
10. Matrix diagonalizations
11. Bilinear forms
12. Quadratic forms
13. Inner-products, norms and metrics
14. Euclidean vectors

### Mathematical Analysis – Alexandru BICA

1. Differential calculus on the real axis: the first order derivative, mean value theorems, finding extrema and optimization problems
2. Taylor's formula and applications
3. The space  $\mathbb{R}^n$ : structure, scalar product, norm, open sets, neighbourhood of a point. Vectors in  $\mathbb{R}^2$  and  $\mathbb{R}^3$  : operations, vectorial product
4. Continuous functions on  $\mathbb{R}^n$ . First order partial derivatives, the differential of first order
5. Gradient vector of a scalar field, the directional derivative. Vectorial fields: divergence and rotor
6. The Jacobi matrix. Partial derivatives of composite functions
7. Second order and high order partial derivatives. The Hesse matrix and the differential of second order. Taylor's formula in  $\mathbb{R}^n$
8. Finding local (relative) extrema for functions of several variables. Extrema with restrictions
9. Improper integrals. Parameter dependent integrals
10. The length of a curve in  $\mathbb{R}^2$  and  $\mathbb{R}^3$ . First kind line integrals (the line integral along piecewise smooth curve of a scalar field)
11. Second kind line integrals (line integrals of vector fields). Path independence
12. Double integrals: the double integral over a normal domain, change of variables (polar coordinates), the area of a set from  $\mathbb{R}^2$ , Green's theorem
13. Triple integrals: the triple integral over a normal domain, change of variables (spherical coordinates, cylindrical coordinates), volumes and gravity center, moments of inertia
14. The area of a surface. Surface integrals of scalar fields
15. Orientable surfaces. Surface integral of vector fields
16. The Gauss-Ostrogradski divergence theorem. The Stokes' theorem

### Physics – Eugen Macocian

### Computer aided graphics - Radu SEBEȘAN

1. Introductory computer-aided graphics
  - 1.1. Integration of CAE-CAD-CAM components
  - 1.2. CAD software package categories
  - 1.3. CAD Resources for Internet
  - 1.4. Manufacturers and CAD software
2. The graphic elements in the realization of electrical and electronic projects with the help of the

computer

- 2.1. Automatic Electronic Design (EDA)
- 2.2. Electronic Documentation
- 2.3. Conventional signs used in electrical and electronic schemes
3. Basic rules in the representation of computer and electrical schemes
  - 3.1. Conditions imposed on control systems
  - 3.2. System flexibility and order convenience
4. Electrical schemes. Computer-aided graphic representation methods
  - 4.1. Electrical schemes
    - 4.1.1. Explicative (functional, circuit, equivalent)
    - 4.1.2. Connection (external, internal, terminals)
    - 4.1.3. Location
5. Presentation of the OrCAD program
  - 5.1. Overview of the OrCAD software package
    - 5.1.1. OrCAD Capture
    - 5.1.2. OrCAD Layout
6. Creating the OrCAD Capture PC Board Wizard project
  - 6.1 Launch of the Orcad Capture program and the project management application.
7. Presentation of the Electronics Workbench program
  - 7.1. Electron Workbench program menu, editing the electronic drawing

#### **Computer programming and programming languages I - Cornelia GYÖRÖDI**

1. Introduction to Programming in C
2. Structured Programming in C
3. Control structures in C
4. Variables, operators and expressions
5. Functions in C
6. Array type in C
7. Pointers in C
8. Strings in C
9. Structures and unions in C
10. Recursion
11. Bitwise fields
12. Dynamic structures
13. Input/Output (I/O) functions for files

#### **Logic Design I – Erica MANG**

1. Boolean Algebra. The inverter circuit. Transfer function of a switching circuit.
2. Operations with functions. Standard Representation of Logic Functions.
3. Complete operating systems. Representation modes.
4. Dual of Boolean Expression. Classes of Boolean functions. Self-dual Boolean functions.
5. Minimization method using boolean algebra axioms and theorems. Karnaugh map.
6. Karnaugh map simplification.
7. Minimizing functions with more than four variables. Condensation of minimization charts.
8. Quine – Mccluskey method.
9. Combinational Circuit Analysis.
10. Synthesis of networks with logical elements.
11. Adders/subtractors.
12. Multiplexers, demultiplexers, code converters.
13. Decoders. Encoders. Numerical comparators. Parity Circuits.
14. Programmable logic areas. Minimizing programmable logic areas

#### **Applied Informatics I – Mirela PATER**

1. Introduction
2. Informational systems. Informatics systems.
3. Arithmetic bases of computers. Algorithms

4. Computer systems evolution
5. Computers architecture principles
6. Computer networks principles
7. Operating systems principles
8. Utilities programs
9. Internet network. Internet services
10. Software programming principles

### **Foreign language (English) 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**

### **1<sup>st</sup> year of study – 2<sup>nd</sup> semester (spring)**

#### **Special mathematics – Ioan 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

---

### **Computer programming and programming languages II – Simina COMAN**

1. Introduction
2. Search and sort algorithms for static data structures
3. Array data types
4. Recursive algorithms
5. List data structure
6. Dispersion technique

---

### **Logic Design II – Erica MANG**

1. Sequential Logic. State diagrams, next-state table. Mealy/Moore finite state machines
2. Flip-flops
3. "MASTER - SLAVE" Flip-flops. Synthesis of sequential circuits
4. Asynchronous counters
5. Synchronous counters
6. Sequential circuit representation patterns. Automation transformation.
7. State minimization, encoding.
8. Synthesis of asynchronous sequential circuits. Timing Hazards
9. Synthesis of synchronous sequential circuits.
10. Adders. Clock pulse generator. Synthesis of a synchronous sequential scheme that performs elementary operations.
11. Hardware description languages.
12. Basic concepts in VHDL
13. Basic Elements of VHDL Language.
14. VHDL language instructions.

---

### **Electrotechnics I – Carmen MOLNAR**

#### **A. LINEAR ELECTRIC CIRCUITS IN STATIONARY REGIME**

1. Generalities. Elements of DC circuits.
2. Current-voltage characteristics of linear circuit elements.
3. Kirchhoff's theorems. Independent equations.
4. Transfiguration theorems.
5. Methods of calculation of linear electrical circuits.
6. Theorem of Conservation of Powers.
7. Applications specific to direct current.

#### **B. ELECTRICAL DC CIRCUITS WITH NON-LINEAR ELEMENTS**

1. Nonlinear elements. Characteristics
2. Kirchhoff's theorems and small variations.
3. Methods of solving nonlinear networks. Graphic methods.
4. Nonlinear circuits connected in series / parallel.
5. Non-linear element connected in series with a linear element

#### **C. ELECTRIC CIRCUITS IN THE PERMANENT SINUSOIDAL REGIME**

1. Generalities. Circuit Elements (Resistor, Coil, Connected Coils, Condenser. Voltage sources, current sources).
2. Kirchhoff's theorems and Joubert's theorem in instantaneous values / in complex form.
3. Alternative sinusoidal sizes. Complex representation of sinusoidal alternative sizes.
4. RLC series circuit. Parallel RLC circuit.
5. Impedance complex.
6. The analogy of the sinusoidal alternating current and direct current.

7. Electrical power in single-phase AC circuits.

---

### **Applied Informatics II – Elisa Valentina MOISI**

1. Introduction. A Brief Overview of the Web
  2. Hypertext Markup Language (HTML)
  3. Cascading Style Sheets (CSS). Generated Elements
-

4. The Box Model. Positioning content.
5. Typography on the Web. Backgrounds and Gradients
6. Lists. Tables. Forms.
7. Media. HTML & CSS – Random Bits. Print CSS
8. HTML5. CSS3 – Transforms, Transitions, Filters, Animations
9. CSS3 – Approaches to Layout
10. Responsive Design
11. CSS Frameworks
12. Preprocessors
13. Accessibility. Search Engine Optimization.
14. Revision

### **Theory of probability and mathematical statistics – Octavia BOLOJAN**

#### A. Probability Theory

1. Probability field
2. Probabilistic schemes
3. Random variables
4. Numerical characteristics of random variables
5. Random vectors. Distribution function. Probability density function. Covariance. Correlation coefficient. Regression.
6. Characteristic function. Definition. Properties.
7. Classical probabilistic repartitions (

#### B. Mathematical Statistics

8. Selection (Sample) Theory notions. Repartition of sample data. Sample mean. Sample dispersion.
9. Estimation Theory notions. Types of estimations. Confidence Intervals method. Tests of Significance. The method of moments estimator. The method of maximum likelihood estimator.
10. Statistical hypothesis tests. Rejection region. Type I and II errors. Hypothesis and significance testing concerning means: The Z-test and T (Student)-test for the mean. The Chi-squared-test for variance. The F-test for the ratio of variances.

### **Electronic devices and analog electronics - Ovidiu NEAMTU**

1. Components of electronic circuits.
2. Zener diode. Voltage stabilizer with Zenner diode
3. The bipolar transistor.
4. Thyristor. Triac. The IGBT transistor.
5. Optoelectronic devices
6. Linear integrated circuits I, characteristics, amplification calculation of a non-inverse AO with negative feedback loop
7. Linear Integrated Circuits II, the calculation of amplification of an AO in inverse mounting with the negative feedback loop, the calculation of amplification of a AO in differential mounting
8. Linear integrated circuits III, Norton amplifiers, AN voltage amplifier.
9. Analog comparators, AO comparators, AN comparators, integrated comparators.
10. Stabilization circuits, integrated electronic stabilizers.
11. Amplifiers, features, audio amplifiers built with integrated circuits.
12. Oscillators, positive feedback oscillators, quartz oscillators.

### **Foreign Language (English) 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

### 2<sup>nd</sup> year of study – 1<sup>st</sup> semester (autumn)

#### Electrotechnics II – Carmen MOLNAR

##### A. ELECTRIC CIRCUITS IN THE PERMANENT SINUSOIDAL REGIME

1. Kirchhoff's and Joubert's complex theorems for magnetically coupled circuits.
2. The power factor. Power factor compensation. Constructive solutions for power factor compensation.
3. Maximum Power Transfer Theorem.
4. Resolving AC circuits in permanent sinusoidal mode (The method of Kirchhoff's theories.
5. The Cyclic Current Method. Potential node method. Transfiguration theorems).
6. Transfiguration of serially / parallel connected circuits.
7. Resonance phenomena in AC circuits (Resonance of voltage. Resonance of Current).

##### B. THREE-PHASE ELECTRICAL CIRCUITS

1. Circuits and three-phase systems. Generalities.
2. Producing a symmetrical three-phase voltage electric system.
3. Three-phase circuit connections (Star connection, Triangle connection).
4. Receivers connected in star phase with / without neutral conductor.
5. Electrical power in three-phase electric circuits.

##### C. ELECTRICAL LINEAR CIRCUITS IN NON-SINUSOIDAL PERIODIC REGIME

1. Non-sinusoidal periodic regime. Generalities.
2. Decomposition of periodic functions in Fourier series.
3. Actual and average values of periodic functions. Coefficients characteristic of periodic functions.
4. Analysis of electrical circuits in permanent non-sinusoidal regime by decomposition into harmonics.
5. Resistor under voltage at non-sinusoidal terminals.
6. Voltage coil at non-sinusoidal terminals.
7. Voltage capacitor at non-sinusoidal terminals.
8. RLC voltage circuits at non-sinusoidal terminals.
9. The Power in non-sinusoidal regime.

##### D. ELECTRICAL LINEAR CIRCUITS IN TRANSITORY REGIME

1. Generalities.
2. Circuits RL, RC series in transient mode. Direct method.
3. The method of the Laplace transform.
4. Some clarifications on the application of the Laplace transform in the study of electrical circuits.
5. The operational form of the circuits equations. Operational impedances.
6. Networks under zero initial conditions.
7. Networks under initial conditions other than zero.

##### E. GENERAL ASPECTS ABOUT THE ELECTROMAGNETIC FIELD

1. Electromagnetic field-specific terms and notions in electrostatic, electrokinetic and stationary magnetic fields.

## 2. General laws of electromagnetic phenomena.

### **Numerical Methods – Octavia BOLOJAN**

1. Introduction to Matlab programming
2. Errors and Floating Point Arithmetic. Introductory notions
3. Numerical Methods for solving linear algebraic systems (direct and indirect methods)
4. Interpolation and approximation and regression
5. Solving nonlinear equations

### **Digital electronics I – Mircea Petru URSU**

1. Pulse Circuit Analysis Methods. Methods of analysis of switching circuits.
2. Logic circuits. Elements of logical algebra.
3. Integrated logic circuits parameters.
4. Integrated logic circuits with diodes and tranzistor (RTL).
5. Integrated logic circuits with diodes and transit (DTL).
6. Integrated logic circuits TTL.
7. Logic circuits with MOS transistors.

### **User Interface Design – Gianina GABOR**

1. Terminology, methods used to design interfaces, perspectives of user-interface design,
2. Design methodologies
3. Desktop applications
4. User interaction
5. Web site interface design
6. Graphical user interface design for applications implemented on mobile devices
7. Responsive web applications design using media queries and bootstrap
8. HTML5 – new characteristic elements, new semantic elements
9. HTML5 / drawing – canvas 2D, 3D, inline SVG
10. HTML5 – native drag & drop, desktop drag, web socket, messaging, web workers, device orientation, geolocation
11. CSS3
12. JavaScript; jQuery/ JavaScript
13. JavaScript; jQuery for mobiles
14. User interfaces design of Windows 8 & Windows 10

### **Java Programming – Mirela PATER**

1. Fundamental concepts of OOP
2. Java bases. Language syntax
3. Object and Driver classes
4. Control structures
5. Strings and exceptions
6. Classes, Objects and Methods
7. Methods overloading
8. Nested classes
9. Inheritance
10. Polymorphism
11. Interfaces
12. Abstract classes
13. Collections

### **Data Structures – Doina ZMARANDA**

1. Tree Data Structure. Traversing trees: pre-order, in-order, post-order.
2. Tree Data Structure implementation: using a table data structure, using linked lists.
3. Binary trees. Transforming a tree into a binary tree. Binary trees implementation. Traversing binary trees.
4. Ordered binary trees. Minimum height binary trees.
5. Basic operations on ordered binary trees: searching, insertion, deletion.
6. AVL Trees. Characteristics. Insertion and deletion in AVL trees.



7. B-trees. Characteristics. Insertions and deletions in B-trees.
8. Graph data structure. Types of graphs.
9. Graphs implementation using adjacency matrix. Graphs implementation using adjacency lists.
10. Graphs Depth First Traversal algorithm.
11. Graphs Breadth First Traversal algorithm.
12. Weighted graphs. Minimal spanning tree. Algorithms for determination of minimal spanning tree : Prim's algorithm, Kruskal algorithm.
13. Minimal paths in graphs: Dijkstra algorithm, Floyd algorithm.
14. Transitive closure of a graph. Warshall algorithm.

#### **Electronic measurements, sensors and transducers – Mircea GORDAN**

1. Introduction.
2. Measurement errors.
3. Methods and means of electrical measuring. Metrological characteristics.
4. Means of electrical measuring in dynamic mode.
5. Analogue measuring instruments. Operating principles.
6. Digital measuring devices. Operating principles.
7. Measurement of current and electrical voltage.
8. Measurement of resistance and impedance.
9. Measurement of electrical power.
10. Measurement of electrical energy.
11. The acquisition system architecture and the architecture of analog data generation systems.
12. Electrical transducers.

#### **Foreign Language (English) 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**

### **2<sup>nd</sup> year of study – 2<sup>nd</sup> semester (spring)**

#### **Computer Structure and Organization – Daniela Elena POPESCU**

1. Getting Started with Architecture, Organization, Function and Structure of Computers. The basic structure of a computing system.
2. Memory. The structure of the Operational memory (MO). RAM Memory. Cache Memory. Associative Memory (MA).
3. The Input / Output System, the Connection topologies. Communications via bus. Protocols. Arbitration. Methods of communication with IO devices (Inputs-Outputs, Interrupts, DMA).
4. Operating system Support Overview, Scheduling, Memory management



5. Computer Arithmetic. The Arithmetic and Logic Unit (UAL). The Adder.

---

**Digital Electronics II – Mircea URSU**

---

1. Methods for IC design
2. Medium scale integrated circuits
3. MOS IC'S. NMOS logic circuits
4. Emitter-coupled logic IC'S
5. IC multivibrators
6. RAM, ROM EPROM memory circuits

---

**Systems Theory – Gianina GABOR**

---

1. Dynamic systems definitions and terminology
2. Control system structures
3. Mathematical models used in systems theory
4. Main methods used to obtain the mathematical/abstract models of the systems
5. Operating modes
6. Matrix and transfer functions of linear systems
7. Transfer functions of linear systems
8. Mathematical models of system connections
9. Linear systems
10. Linear systems response in steady-state and transitory mode, state transformations and systemic implementations
11. Systems stability
12. Algebraic criteria for linear system stability of continuous and discrete systems
13. Systems accessibility
14. Basic control system structures (direct and with feedback) &

---

**Computer Graphics Elements – Mirela PATER**

---

1. Introduction
2. Graphic equipment
3. Graphic geometric primitives
4. Coordinate systems
5. Geometric transformations (2D and 3D)
6. Fundamental 2D and 3D transformations (scaling, translation, rotation, shear)
7. Projections
8. Clipping transformations
9. Visualization transformations (2D and 3 D)
10. Images synthesis methods

---

**Object Oriented Programming – Doina ZMARANDA**

---

1. OOP basic programming concepts in C#: classes and objects.
2. Abstract and sealed classes.
3. Namespaces, encapsulation and access control.
4. Constructors and destructors. Types of constructors.
5. Polymorphism. Virtual methods and dynamic binding.
6. Interfaces and generic clases/structures. Microsoft .NET Framework interfaces.
7. Collections. Microsoft .NET Framework collections: generic and non-generic collections. LINQ on objects (collections).
8. Serialization: binary and XML serialization.
9. Delegates and events. Lambda expressions.
10. Attributes and reflection.
11. Threads in .NET.
12. Database access in .NET using ADO.NET.
13. Using an ORM: ADO.NET Entity Framework - mapping, context objects.
14. Object oriented design using UML.

---

**Data bases – Cornelia Gyrodi**

---

1. Elements of database theory
-

2. Entity-relationship model
3. Normalization theory of relational databases
4. Concepts used in the relational model
5. Relational languages. SQL language
6. Data types in SQL
7. Defining the schema of a relational database
8. Defining of index files and views
9. Join operations in SQL language
10. Advanced join techniques
11. Aggregate functions in SQL
12. Subqueries in SQL
13. Single-row and multiple-row subqueries
14. Sets of operators in SQL
15. Controlling access to the relational database
16. Transaction control in the relational database

#### **Foreign Language (English) 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**

### **3<sup>rd</sup> year of study – 1<sup>st</sup> semester (autumn)**

#### **Design with Microprocessor I – Stefan VARI-KAKAS**

1. Introduction
2. Internal data representation
3. Memory organization
4. Central processing unit
5. Microprocessor operation
6. Microprocessor connections
7. Main memory
8. Memory circuit types
9. Programmed input/output
10. Interrupt driven input/output
11. Parallel interfaces
12. Serial interfaces
13. Direct memory access
14. Timers

#### **Computer Architecture II – Daniela POPESCU**

1. Instruction Sets: Characteristics and Functions, Addressing Modes and Functions
2. Processor Structure and Function. Processor Organization, Register Organization. Control Unit Operation. Microprogrammed Control
3. Generalities of Computer Networks, Network Topologies and Standards, HDLC Protocol. The ISO model of the OSI architecture. ARPA Internet Network. Topologies and network standards.
4. Parallel Computers Architectures,
5. Parallelism in Time and Space - Pipelining Concept, Organization of Memory in Pipeline Structures, Pipeline Units. Overview of Multicore Processing
6. Vector Processing, The Typical Structure of a Vector Calculator, The Vector Processing Concept and the pipelining. Examples of vector processors.
7. Data Flow & Systolic Architectures. Architectures based on data flow concept, Graphic representation of programs. Types of data flow architectures. Systolic architectures, Types of systolic structures

#### **Data Bases II – Cornelia Gyorodi**

1. PL/SQL language
2. Data manipulation using PL/SQL language
3. Transaction control
4. Control structures in PL/SQL
5. Cyclic instructions in PL/SQL
6. Data types composed in PL/SQL
7. Defining cursors. Cursors with parameters
8. Exceptions in PL/SQL
9. Stored procedures and functions
10. Packages
11. Dynamic SQL
12. Libraries and Languages for Programming Database Applications
13. Security control of database
14. Transaction control
15. Interlock study
16. Restoring the database
17. Object-oriented databases
18. Principles of object modeling
19. The fundamental characteristics of SGBDO

#### **Computer Graphics Elements – Mirela PATER**

1. Introduction

2. Graphic equipment
3. Graphic geometric primitives
4. Coordinate systems
5. Geometric transformations (2D and 3D)
6. Fundamental 2D and 3D transformations (scaling, translation, rotation, shear)
7. Projections
8. Clipping transformations
9. Visualization transformations (2D and 3 D)
10. Images synthesis methods

---

#### **Computer Aided Design – Daniela MASTEI**

1. Introduction
2. Drawing and processing of electrical schematics with support of the assisted design environment - creating projects, schematics, libraries. Processing tools.
3. Verification of electrical schematics by simulation. Logical simulation; the analysis of simulation results.
4. Designing of printed circuit boards - wiring diagrams, drilling masks, implantation schematics.

---

#### **Operating Systems I – Robert GYORODI**

1. Introduction
  2. Structure of a Computer System
  3. Structure of an Operating System
  4. Operating System Services
  5. Virtual Machines
  6. System Design and Implementation
  7. Processes
  8. Process Operations
  9. Cooperative Processes
  10. Interprocess communication
  11. Communication in Client-Server Systems
  12. Threads
  13. Multithreading Models
  14. Windows Threads
  15. Linux Threads
  16. Java Threads
  17. CPU planification
  18. Process Synchronization
  19. Interblocking Processes
  20. Unix Operating System
  21. The Main Unix Commands
  22. Shell Procedures (Shell Scripts).
  23. Unix Operating System Architecture
  24. Interprocess Communication under the Unix Operating System
- 

#### **3<sup>rd</sup> year of study – 2<sup>nd</sup> semester (spring)**

##### **Multimedia Systems – Ovidiu NOVAC**

1. Introduction to multimedia.
  2. Hardware components used in multimedia.
  3. Software used in multimedia.
  4. Digital video and audio processing. The JPEG standard.
  5. Digital video and audio processing. Video compression standards. MPEG standards.
  6. Digital video and audio processing. Interchange formats of information. Representing image objects. Representing sound objects.
  7. The production process of a multimedia object. Processing of multimedia information.
  8. Graphics and animation programs. 3D Modeling Programs.
-

9. Computer networks and parameters used in multimedia.
10. Multicast. Unicast. Broadcast. Real-time transfer protocols.
11. Video conferencing. Sites, equipment and standards used in video conferencing.
12. Multimedia communication channels. Cable television. UMTS. Digital television.
13. Java Multimedia Framework. Graphical User Interfaces in Java.
14. JAVA Web Applications

---

### Software Engineering I – Ioan MANG

---

#### Design with Microprocessor I – Stefan VARI-KAKAS

1. Multiprocessor buses
2. Multiprocessor system modules design
3. Personal computers. Processors and memories
4. Personal computers. Buses and interfaces
5. Microcontrollers. The PIC family
6. PIC 16/18/24 architecture. The instruction set
7. Power, clock, reset, instruction cycle
8. Parallel ports
9. Interrupts
10. Timers
11. Asynchronous serial I/O
12. Synchronous serial I/O. The I2C bus
13. Data acquisitions and conversions
14. Microcontroller system design

---

#### Real Time Application Programming – Doina ZMARANDA

1. Real-time system's features.
2. Types of real-time systems.
3. Temporal attributes of processes in real-time systems.
4. Real-time systems design methodologies.
5. Models for real-time systems application development.
6. Hardware requirements for real-time applications.
7. Distributed architectures for real-time systems.
8. Software requirements for real-time applications.
9. Real-time programming languages.
10. Concepts of automatic control used in time-real-time systems: data acquisition, operational control.
11. Supervisory control and SCADA systems.
12. Real-time operating systems (RTOS) features.
13. Examples of RTOS for real-time and embedded systems
14. Performance analysis of real-time systems. Reliability and fault tolerance

---

#### Operating Systems II – Robert GYORODI

1. Interprocess communication under UNIX operating system - System V version
  2. Interprocess communication under UNIX operating system – BSD variant
  3. Win32 / 64 System - Evolution and System Components
  4. Win32 / 64 System - File Subsystem - NTFS
  5. Win32 / 64 System - File Subsystem - FAT 12/16/32
  6. Win32 / 64 System - Principles of designing an application
  7. Win32 / 64 System - Case Study - Designing a Model Application
  8. Win32 / 64 System - Thread Execution
  9. Win32 / 64 System - Services
  10. Win32 / 64 System - Network Communication and Security System
  11. Memory Management
  12. Virtual Memory
  13. Storage Systems
-

### **Formal Languages and Translators – Elisa Valentina MOISI**

1. Introduction
2. Scanning
3. Context-Free Grammars and Parsing
4. Top-Down Parsing
5. Bottom-Up Parsing
6. Semantic Analysis
7. Runtime Environments

### **Data Security Techniques – Ioan MANG**

### **4<sup>th</sup> year of study – 1<sup>st</sup> semester (autumn)**

#### **Peripheral Interfaces and Equipments - Daniela MASTEI**

1. Introduction
2. General concepts regarding the I / O system, the concepts of peripheral equipment servicing;
3. Remote information transmission, serial communication protocols;
4. High speed serial interfaces; USB; FireWire
5. Displaying information; Video adapters; Color representation. Video memory. Graphic accelerators. 3D accelerators; Types of display devices
6. Magnetic recording of information; magnetic data recording standards; hard disk interfacing.
7. Optical recording of information; technologies and standards for CD drives; interfacing
8. Printing technologies.

#### **Testing techniques of computer systems – Daniela POPESCU**

1. General presentation of the logic circuit testing
2. Built in self-testing
3. Generation of tests
4. Logical simulation of digital circuits
5. Fault simulation
6. Reconfiguration of digital structures for facilitation of testing. Bist on line.
7. Bist off line reconfigurations for adders testing

### **Software Engineering II – Ioan MANG**

#### **Computer systems 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

#### **Computer Networks – Florin VANCEA**

1. M2M communication principles

2. Network types. Service types. Switching types.
3. Architectural models. ISO-OSI model – layers, primitives.
4. TCP/IP model. UIT-T model.
5. Physical Layer – informational issues, transmission types, information encoding, transmission media
6. Physical Layer – specific equipments, other external resources, PSTN, modulation/demodulation, multiplexing/demultiplexing.
7. Data Link Layer –functions, error protection, specific protocols, HDLC-based protocols, PPP.
8. Media Access Sublayer.
9. LAN/MAN – transmission media, cabling, protocols, standards.
10. Network Layer – routing, congestion control.
11. Internet Protocol.
12. Transport Layer – service class, addressing, multiplexing, flow control.
13. Transmission Control Protocol.
14. Application protocols in Internet

---

#### **Expert Systems – Cornelia GYORODI**

1. Representing knowledge through logic
2. Representing knowledge through rules
3. Elements of predicate logic
4. Operation of rule-based expert systems
5. Modes of reasoning in the evaluation of the rules
6. Search strategies used to solve the problem
7. Principles of logic programming in Prolog
8. Types of data in Prolog
9. Predictive programming
10. Determinism and nondeterminism
11. Lists and applications of lists in Visual Prolog
12. Representing trees in Visual Prolog
13. Databases in Visual Prolog
14. Structured knowledge model
15. Object Oriented Programming in Visual Prolog
16. Applications in Visual Prolog

---

#### **General management - Rica IVAN**

1. Management definition
  2. Industrial management
  3. Management development in Romania
  4. Management functions
  5. The company and the environment
  6. Management information systems
  7. Decision making in the company
  8. Production costs
  9. Specific management techniques
  10. Managerial team
- 

### **4<sup>th</sup> year of study – 2<sup>nd</sup> semester (spring)**

#### **IT Communication Techniques – Gianina GABOR**

1. Basic elements of communication and types of communication
  2. Written communication; message
  3. Written communication - conception and implementation of a memo, a letter, a report, a proposal, an advertisement and a press release
  4. Written communication – conception and implementation of a curriculum vitae (CV) and a letter of intent/motivation online;
  5. Written communication technics– conception and implementation of a technical report and a
-



scientific article

6. Written communication; the scientific paper
7. Oral communication technics – methods used to prepare and develop an oral presentation
8. Communication techniques – online environments and Internet, methods used to design and implement a personal web page
9. Communication techniques – major HTML5
10. Communication techniques – using CSS files and the new CSS3
11. Communication; social web (web2.0); ways to implement and update a blog
12. Team work; communication
13. Communication techniques used in social media; social networking
14. Communication techniques; online communities

---

#### **Image Processing – Florin VANCEA**

1. Introduction
2. Image representation
3. Pixel operation
4. Image combining
5. Shift estimation
6. Histograms
7. Color space
8. Image segmentation
9. Morphologic processing
10. Linear processing and filtering
11. Pattern search
12. Shape recognition. Eigenimages.
13. Edge detection. Key point detection
14. Special methods

---

#### **Reconfigurable Computing – Erica MANG**

1. Introduction
2. Reconfigurable architectures PAL, PLA, CPLD, FPGA.
3. FPGA Design
4. Synthesis for reconfigurable device FPGA
5. Temporal placement
6. Partial reconfiguration design
7. System on a programmable chip

---

#### **Web Technologies – George PECHERLE**

1. HTML5
2. JavaScript – introduction, instructions, functions, arrays
3. JavaScript – objects; DOM; JavaScript – events
4. Bootstrap
5. Node JS
6. The MVC architecture
7. Laravel - Getting started
8. Laravel - Middleware, routes, controllers, models, views
9. Laravel - Advanced concepts
10. Web Services
11. Future of web technologies
12. Summary

---

#### **Modeling and Simulation Techniques – Gianina GABOR**

1. Introduction
  2. Techniques in simulation model design
  3. Techniques in execution of simulation models
  4. Techniques in simulation model analysis
  5. Perspective
-

