ECONOMIC ENGINEERING IN ELECTRIC, ELECTRONIC AND ENERGETIC FIELD
(2018 - 2019 academic year)

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

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 Rn: structure, scalar product, norm, open sets, neighbourhood of a point. Vectors in R2 and R3 : operations, vectorial product
4. Continuous functions on Rn. 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 Rn
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 R2 and R3. 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 R2, 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

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 – Florin BEIUŞEANU

1. Elements of mechanics.
    1.1 Kinematics of the material point.
    1.2. Fundamentals laws of motion of the material point.

1.3. Mechanical work. The mechanical energy. Mechanical strength.
1.4. Theorem of kinetic energy variation. Mechanical energy conservation law.
1.5. Cases of the motion of the material point.
1.6. The motion in a uniform force field.
1.7. The motion in a uniform force field in the resistive medium.
1.8. The motion in a conservative field of elastic forces. Simple harmonic motion.
1.9. Amortized harmonic motion.
1.10 Maintained harmonic motion.
1.11 Composition of harmonic oscillations.
1.12. The propagation of oscillations in the elastic medium.
1.13. Elastic waves. Wave equation. Wave energy. The equation of wave propagation.
1.14. Wave propagation in solid materials

2. Fundamentals of thermodynamics.
2.1. General notions.
2.2. The general law of thermodynamics.
2.3. The first law of thermodynamics.
2.4. Applications.
2.5. The adiabatic transformation
2.6. Second law of thermodynamics.
2.7. Calculation of Carnot efficiency.
2.8. Entropia.
2.9. Third law of thermodynamics.

3. Fundamentals of electrostatics.
3.1. The electrical field.
3.2. The electrical charge.
3.3. The electrical flow. Gauss's law.
3.4. The electrical dipole.
3.5. Fundamentals of electricity.
3.6. Ohm's Law.
3.7. The electrical Conductivity

4. Fundamentals of magnetostatics.
4.1. The magnetic field.
4.2. The magnetic force.
4.3. Electrodynamic force.
4.4. Biot-Savart law.
4.5. Magnetic circuit law.
4.6. Magnetic flux.
4.7. Gauss's law.
4.8. Magnetic dipole.
4.9. Magnetic dipoles of the atoms

5. Fundamentals of electromagnetism.
5.1. The laws of electromagnetism.
5.2. Maxwell's equations

6. Magnetic properties of mater
6.1. The susceptibility and magnetic permittivity.
6.2. Diamagnetic substances.
6.3. Paramagnetic substances.
6.4. Ferromagnetic substances.

7. Fundamentals of optics
7.1. The fundamental laws of geometrical optics
7.2. The laws of reflection.
7.3. The laws of refraction
7.4. Total reflection.

7.5. Flat mirror.
7.6. Spherical mirrors.
7.7. Blade with parallel plane sides.
7.8. Optical prism, Lenses, Spherical diopter

Chemistry – Claudia MORGOVAN

1. Notions about the atom.
2. Electrical conductors.
3. Transport of electricity through interfaces and electrolyte solutions.
4. Balances at electrically charged interfaces. Potentials of the electrodes.
5. Galvanic elements.
6. Corrosion and protection against corrosion.
7. Applications of electrochemistry. Electrochemical energy sources.

Applied informatics – Marius ROMOCEA

1. Arithmetic and logic basis of a computing system
2. Computing systems
3. Operating systems
4. Microsoft Office 2010 suite (Word, Excel, PowerPoint)
5. Algorithms

Technical and infographic drawing I – Maria DURGĂU

1. Presentation of the AutoCAD operating mode. The AutoCAD User Interface. Launching orders. Data input. Selecting objects. Display Control. Establishing the drawing environment. End of work session.
2. Use basic commands for drawing, editing, and specifying entity-specific points. Draw commands for base entities. Commands used to modify and edit drawings. Using Object Snap Modes (Object SNAP). Selection sets.
3. Using the UCS coordinate system in plane drawing (2D). Orders for making connections and bevels. Orders that allow copying, moving, scaling, and splitting entities.
4. General rules for the execution of the technical drawings Lines used in the technical drawing. Formats of technical drawings. Indicator. Numerical scales used in the technical drawing. Standardized writing. Representations used in industrial design: Representation in double and triple orthogonal point projection.
5. Orthogonal representation of the straight. Double Orthogonal Projection of the Straight. Triple Orthogonal Projection of Straight.
6. Rules for the representation and marking of views and sections. Layout of the projections in the plan. Classification of views. Section representation of parts. Classification of sections. Notation of section sectioning path.
7. Use of commands for quoting drawings. Rules and quotation rules. Elements of quote. Symbols used for enrolling quotas. Quoting specific elements. Classification of allowances. Quoting methods.
8. Quoting drawings with AutoCAD. Configuring Query Elements. Print text. Text style. Text input
9. Viewing a drawing. Hatching and representing breaks. Study some drawing display commands. Hatching. Hatch styles. Representation of ruptures.
10. Using Layers. Layer Definition. Create and modify layers. Determining the color and layer type of layers. Define blocks. Studying commands for creating and inserting blocks into AutoCAD.
11. Elements of 3D Modeling and Visualization. Introduction to 3D modeling. Types of three-dimensional models. Superficial models. Coordinate systems in 3D. Creating surfaces. Modeling solids. Generating Solids. Editing Solid Objects. Quoting in 3D
12. Presentation of the OrCAD Capture program. Present the steps required to create the electrical schemes using the OrCAD Capture program.

Elements of mechanical engineering – Tiberiu BARABAŞ

1. Fundamentals
2. Statics of a Particle
3. Statics of a Rigid Body

4. Kinematics of a Particle
5. Kinematics of a Rigid Body
6. General theorems and methods in Dynamics

Technological methods and procedures – Livia BANDICI

1.Getting started with technological methods and processes
- 1.1. Production process;
- 1.2.Technological flow;
- 1.3.Quality technical control

2. Material properties
- 2.1. Properties of materials and tests;
- 2.2. Physical properties;
- 2.3. Electrical properties;
- 2.4. Magnetic properties;
- 2.5. Mechanical properties and tests;
- 2.6. Chemical properties;
- 2.7. Electrical properties of insulating materials

3. Materials used in industry
- 3.1. Materials used in machine building;
- 3.2. Metals and alloys used in electrical engineering;
- 3.3. Electrical insulating materials used in electrical engineering

4. Methods and processes of cold machining
- 4.1. Methods and processes for splitting machining;
- 4.2. Methods and processes for processing materials by cutting and cold plastic deformation;
- 4.3. Unconventional technologies.

5. Innovative technologies in material processing
- 5.1. Plasma cutting technology;
- 5.2 Friction rotation with rotating element;
- 5.3. 2D and 3D Laser Testing;
- 5.4. Non-destructive processing of materials;
- 5.5. Laser processing by shock;
- 5.6. Innovative pressing processing

6. Corrosion and corrosion protection of metals and alloys
- 6.1 Corrosion of metals;
- 6.1.2. Chemical corrosion;
- 6.1.3. Electrochemical corrosion;
- 6.2. Corrosion protection of metals and alloys.

English language I – Simona ABRUDAN

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

Computer programming and programming languages II – Mirela PATER

1. Structures of C++ programs – labels, constants, types, variables
2. C++ data types and operators
3. C++ instructions (read, write, if, switch, while, do while, for)
4. Arrays in C++ (vectors, matrices)
5. Strings in C++
6. Structures in C++
7. Text files in C++

Technical and infographic drawing II – Radu SEBEŞAN

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

Economy basis – 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

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

Electromagnetic field theory – Laura COROIU

1. Electrostatic
2. Electrokinetic
3. Electromagnetism
4. Electrodynamics

Foreign Language (English) II – Simona ABRUDAN CACIORA

Physical Education and Sport II

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

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

Managerial communication – Simona ABRUDAN

1. Managerial communication – content and context. Objectives of managerial communication.
2. Barriers that occur frequently in Managerial Communication. How to improve the efficiency of the managerial communication process. Active listening and feedback.
3. Verbal managerial communication: specific situations, presentation methods, structure of oral presentations. Speeches.
4. Other types of verbal managerial communication: briefing, reporting, training sessions, meeting, telephone communication. Question answering techniques.
5. Non-verbal communication
6. Written managerial documents (1). Writing skills. Types of specific managerial documents: enumeration and short presentation.
7. Written Managerial Communication (2): Business Letters: the format of Business Letters, Style and Tone of Business Letter, Types of Business Letters: Enumeration.
8. Communication in Human Resources Management: Types of interviews used in organizations. Details: Employee Performance Assessment Interview and Personnel Selection Interview
9. Drawing up a CV and a letter of intent
10. Communication in Human Resource Management. Communication in recruiting and selecting staff.
11. Communication in conflict management
12. Negotiation: Definition, stages of the negotiation process, types of negotiators, rules of conduct and useful strategies during negotiation.
13. Forms of communication in negotiation. The influence of cultural factors on the negotiation process.
14. Communication in virtual business.

General economy – Liliana MĂGDOIU

1. Consumer behavior
2. The market
3. Economic competition
4. The enterprise
5. Producer behavior
6. Consumer behavior
7. Production costs
8. Selling prices
9. Entrepreneur's profit

Electric and electronic measurements I – Mircea GORDAN

1. Introduction.
2. Methods and means of electrical measuring. Metrological characteristics.
3. Measurement errors.
4. Means of electrical measuring in dynamic mode.
5. Analogue measuring instruments. Operating principles.
6. Digital measuring devices. Operating principles.

Electronics I – Cornelia GORDAN

1. Overview
2. Diodes
3. The bipolar transistor
4. Field effect transistors
5. The thyristor
6. Operational amplifiers
7. Rectifiers
8. Circuits with thyristors

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).

Law – Anca PĂCALĂ

1. Introductory notions in law. Terminology and definitions. The division of law. The legal rule. Classification of legal rules. The structure of the legal rule. Action of the legal rule.
2. Constitutional law and political institutions Definition, specific features, scope. The main institutions of constitutional law. The fundamental rights, freedoms and duties of citizens. The political system in Romania. The principle of separation of powers in the state. The specificity of each of the three powers in the state.
3. Criminal law. General notions, definition. Necessity and purpose of criminal law. Characters and Principles in State Penal Policy. The object of regulation of criminal law. The legal report on criminal law and its subjects. Offense. Constituent elements. Delimitation of contravention. Causes that eliminate the criminal nature of the act. Criminal sanctions. Causes that remove criminal liability.
4. Financial and fiscal law. General concepts of public finances. The structure of public finances. Legal regulation of public finances: financial law; budgetary law: fiscal law. Public budget and fiscal policy of the state. Tax revenues. Fees and taxes. Definitions, Characters, Classifications. Entities of taxation. Methods of execution of tax obligations.

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

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

Electromagnetic compatibility - Marius SILAGHI

1. Introduction in electromagnetic compatibility
2. Circuit models, couplings, emissions
3. Immunity. EMC
4. Energy quality monitoring
5. Technology and management of EMC
6. Technical and qualitative level of EMC

Management basis – Liliana MĂGDOIU

1. Management definition
2. Job analysis
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

Electronics II – Cornelia GORDAN

1. Stabilization circuits
2. Basic amplifier circuits
3. AC Amplifiers
4. DC Amplifiers
5. Oscillation circuits
6. Switching circuits
7. Logical circuits

Accounting – Rica IVAN

1. Essence and role of accounting in the information system
2. Account system and double registration
3. Double registration and its meaning
4. Balance sheet
5. Functions of balance sheet
6. Analysis of capital and fixed assets accounts
7. Analysis of stock accounts and third parties
8. Analysis of treasury accounts
9. Trial balance
10. Registers and forms of accounting

Business Informatics – Dragoş SPOIALĂ

1. Introduction to Business informatics
2. UNIX operating system. Case Study
3. The UNIX file system. Case studies
4. Managing files and folders. Case studies
5. Text editors. Case studies
6. Processes. Case studies
7. UNIX Shells. Case studies
8. Unix-Linux network configurations and services
9. Security features of Unix-Linux systems
10. Unix-Linux graphical environment. Case studies

Economic Legislation – Anca PĂCALĂ

1. Legislation on the commercial and production functions of the electrical, electronic and energy units.
2. Commercial contracts - definitions, conditions. Commercial sale and purchase contract. Transport contracts Intermediation contracts. Deposit contract.
3. Contracts for execution of works, services and cooperation Design, technical assistance, engineering and consultancy contracts; Entrepreneurial contract; Service and service contract.
4. Association and design contracts.
5. Procurement of goods and services by the state units: procedures for awarding the contract, evaluation of tenders and award of contracts.
6. Competition law: unfair competition, anticompetitive practices, economic concentration.
7. Payment and payment instruments: check payment order, documentary receipt, documentary letter of credit, bill of exchange, other payment instruments.
8. Legislation related to the research and development function: intellectual property-copyright and its protection; the license agreement, the know-how contract.
9. Licenses, authorizations and accreditations in the electricity sector.

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.

Domain practice –

Electric and electronic measurements II – Mircea GORDAN

1. Measurement of current and electrical voltage.
2. Measurement of resistance and impedance.
3. Measurement of electrical power.
4. Measurement of electrical energy.
5. The acquisition system architecture and the architecture of analog data generation systems.
6. Electrical transducers.
7. The cathodic oscilloscope

Physical Education and Sport IV

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

Electro-hydro-pneumatic equipments in automation – Tiberiu BARABAŞ

1. Passive components of electro-hydraulic equipment. Hydraulic resistors
2. Active components of electro-hydraulic equipment. Hydraulic amplifiers.
3. Applications of electro-hydraulic equipment in automation systems.
4. Passive components and circuits of electro-pneumatic equipment. Pneumatic resistors. Pneumatic capacity.
5. Active components of electro-pneumatic equipment. Regulators.
6. Applications of electro-pneumatic equipments in automation systems. Case studies.

Reliability – Gabriela TONŢ

1. Reliability approached by means of system theory
2. Reliability attrition indicators.
3. Systems without wear. Barlow - Campo test (attrition check).
4. Distribution law associated with failure mechanisms
5. Verification of consistency between the theoretical law and the experimental data from the perspective of information statistics.
6. Overall estimation of system reliability
7. Estimated confidence intervals.
8. Renewal of systems
9. Behavior of systems with renewal at finite time intervals. Availability. Types of renewal
10. Renewal strategies. Adoption of the renewal strategy. Periodic renewal strategies (FRP, BRP, DRP). Non-Periodic Renewal Strategies (ARP). Modeling Markovian Preventive Renewal Strategies (CRP, ERP)
11. Structural Reliability. Functional and logical model. Serial and parallel structural model
12. Methods of analysis of structural reliability. Total probability method. Model of the failure shaft
13. Globall modeling of system reliability through Markov processes. Markovian modeling of systems. Modeling Markov processes, the global description of a system without renewal. Modeling Markov processes for the global description of a system with renewal
14. Structural modeling of system reliability through Markov processes. Model of Markov processes for a series system. Model of Markov processes for a parallel system

Systems modeling and simulation – Laura COROIU

1. Mathematical models of systems and their identification
2. Modeling of continuous time systems
3. Modeling of Digital systems
4. Automatic process management
5. Controllers in automation

Electrical technologies – Claudia STAŞAC

1. The sides and the structure of the production process
2. Structure of execution projects
3. Technology of the execution of the electrical schemes

4. Design technology of the network transformer of low power
5. Study of the technology of making magnetic cores
6. Magnetic core technology for rotary electric machines
7. Winding technology
8. Implementation technology of the coil windings and profiled conductor buckets
9. Technology of contact elements and electricity paths
10. Technology for the manufacture of brushes and electric brushes
11. Technology of contacts manufacturing for electrical appliances
12. Technology of design of printed wirings
13. Technology of execution of the printed wiring
14. Modern Trends in Electrical Technologies

General management – Constantin RADA

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

Negotiation techniques – Rica IVAN

1. Introduction to negotiation theory
2. Culturally specific of negotiation techniques
3. Thomas-Killman model
4. The specifities of conflicts and their typology
5. Negotiation planning

Business law – Anca PĂCALĂ

1. Introduction to Business Law Definition. Object. Evolution. Sources.
2. The business activity. Business facts. Business Law Subjects. Acquiring and Ending the quality of Trader.
3. Business Company - Definition, Types of Commercial Companies. Establishment of commercial companies: the consensual stage, the legal stage, the stage of advertising, registration and tax registration.
4. Driving and controlling the business of the company. Legal personality of the commercial company. The General Assembly. The managers of the company. Dissolution and liquidation of the company: General causes of dissolution; Special causes of dissolution
5. Specificity notes of the societies of persons. Notes of the company's specificity in a collective name. Specificity notes of the company in simple comity.
6. Specificity notes of the capital companies Specificity notes of the joint-stock company Specific notes of the limited-liability company. Specificity notes of the limited liability company.
7. The General Meeting of Shareholders. Convening the General Assembly. Limits of power of the general shareholders meeting Management systems
8. Methods of constituting joint stock companies. Instant formation. Establishment by call for public subscription.
9. Securities issued by joint-stock companies. Actions - Definition, General Characters, Kinds. Bonds: definition, general characters, the issuing procedure.

Static convertors – Adrian ŞCHIOP

1. Overview of static power converters
2. Rectifiers. Single-phase diode rectifiers. Three-phase diode rectifiers.
3. Single-phase controlled rectifiers. Three-phase controlled rectifiers.
4. DC- DC Converters: Step-down (Buck) converter. Step-up (Boost) converter

5. Buck–Boost converter. Cuk Converter
6. AC–AC converters. Single-phase ac–ac voltage controller. Three-phase ac–ac voltage controllers
7. Cycloconverters
8. Inverters. Single-phase voltage source inverters. Half-bridge VSI. Full-bridge VSI. Three-phase voltage source inverters.
9. Sinusoidal PWM. Square-wave operation of three-phase VSIs. Sinusoidal PWM with zero sequence signal injection. Selective harmonic elimination in three-phase VSIs. Space-vector modulating techniques
10. Current source inverters. Carrier-based PWM techniques in CSIs. Square-wave operation of three-phase CSIs. Selective harmonic elimination in three-phase CSIs. Space-vector modulating techniques in CSIs

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

Electrically driven systems – Helga SILAGHI

1. Subject of electrical drives
1.1. Introduction in electrical drives
1.2. Structure and construction of electrical drive systems
2. General problems of electrical drives technology
2.1. The object of the kinematics and dynamics of electrical drives. Motion equation
2.2. Reporting of couples, moments of inertia, strength and mass
2.3. Mechanical characteristics of electric machines and working mechanisms
2.4. Transmission of the movement from the electric machine to the working mechanism
2.5. Electromagnetic couplings
2.6. Stability of electrical drives systems
3. Electrical drives with DC machines
3.1. General relationships and mechanical features for electrical drives with DC machines
3.2. Methods of starting for electrical drives with DC machines
3.3. Braking methods for electrical drives with DC machines
3.4. Speed adjustment for electrical drives with DC machines
4. Electrical drives with asynchronous machines
4.1. General relationships and mechanical features for electrical drives with asynchronous machines
4.2. Methods of starting for electrical drives with asynchronous machines
4.3. Braking methods for electrical drives with asynchronous machines
4.4. Speed adjustment for electrical drives with asynchronous machines

Microprocessor systems – Eugen GERGELY

1. Microprocessors
2. The I8086 microprocessor
3. The Intel Pentium, Pentium MMX, Pentium II, Pentium III, Pentium IV microprocessors
4. Motherboards
5. The main memory
6. Chipsets and support circuits
7. Extension buses

Electrotechnic materials – 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.

Introduction in automatics – Laura COROIU

1. Basics in automations
2. Automation equipment
3. Regulating algorithms and automatic Controllers
4. Properties of automatic systems

Logistical management – Gabriela TONŢ

1. Introduction. The concept of logistics. Renewal of logistics
2. Place the logistics within the firm. Functional logistics domains.
3. Designing the logistics system. Designing the logistic information system.
4. Transports. Inventories. Storage, packaging and handling of materials.
5. Functional and operational integration. Barriers to effective integration.
6. Place the logistics within the firm. Functional logistics domains. Designing the logistics system
7. Designing the logistic information system. Transport. Stocks
8. Storage, packaging and handling of materials. Functional and operational integration. Barriers to effective integration.
9. Logistics resources.
10. Electronic data exchanges. Bar Codes. Inventories
11. Stock Functions. Stock management.
12. Transports.
13. Integrated logistics.
14. Planning logistics activity.

Financial and economic analysis – Rica IVAN

1. Theoretical bases of economic and financial analysis
2. The stagies of the economic and financial analysis process
3. Analysis of production and marketing activity
4. Analysis of production structure
5. Cost analysis of production
6. Profitability analysis
7. Analysis of human resources management
8. Analysis of material resources management

International Commerce Law – Anca PĂCALĂ

1. International trade law. Concept. Features.
2. The legal report of international trade. Concept. Participants in the international trade legal report. Content of the international trade legal relationship. The subject of the international trade legal relationship. Sources of international trade law.
3. International commercial arbitration. Concept. General Characters of International Commercial Arbitration. The legal nature of international commercial arbitration. The law applicable to international commercial arbitration. The arbitration agreement. International Commercial Arbitration in Romania.
4. The International Trade Agreement in general. Concept; legal characters; classification. Elements of the international trade contract. Form and language of the international trade agreement. The law applicable to the international trade contract.
5. Formation of the international trade contract. Pre-contractual steps. The offer to sign contracts. Accepting the offer. The moment of the conclusion of the international trade contract.
6. Content of the International Trade Agreement. Clauses required in the international trade contract. Clauses that evoke strict legal issues. Insurers clauses to avoid or neutralize risks. Insurance clauses designed to counter currency risks. Insurance clauses designed to counteract

unquantifiable risks. The force majeure clause. Other clauses found in the international trade contract.

7. Effects of the International Trade Agreement. Interpretation of international trade agreements. Mandatory force of international trade agreements. Specific effects of sinalagmatic contracts. Execution of international trade contracts.

Practice II

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

The design of electrical systems – Monica POPA

Electrothermy – Livia BANDICI

1. General problems with electrothermal installations.
2. Materials used in the construction of electrothermal equipment
    - 2.1. Refractory materials.
    - 2.2. Heat insulating materials.
    - 2.3. Resistive materials.
    - 2.4. Materials for electrodes of electric arc furnaces.
3. Heat transfer in electrothermal equipment.
    - 3.1. Thermal conduction.
    - 3.2. Thermal convection.
    - 3.3. Thermal radiation.
    - 3.4. Means for measuring temperature
4. Electrical heating heaters.
    - 4.1. Discontinuous direct-heating systems.
    - 4.2. Continuous direct-heating systems.
    - 4.3. Direct heating ovens.
        - 4.3.1. Furnaces for grafting and for production of carborundum.
        - 4.3.2. Glass melting furnaces.
        - 4.3.3. Furnaces for the extraction and refining of aluminum.
    - 4.4. Electric furnaces with resistors for thermal treatments.
        - 4.4.1. Electric furnaces with melting resistors.
    - 4.5. Infrared heating.
    - 4.6. Laboratory electric furnaces.
5. Electric arc furnaces.
    - 5.1. Electric arc furnaces with direct action for steel melting.
    - 5.2. Electric arc furnaces power at continuous voltage.
    - 5.3. Electric arc and resistance furnaces.
    - 5.4. Vacuum melting electric arc furnaces.
    - 5.5. Flow layer melting furnaces.
6. Electromagnetic induction heating.
    - 6.1. The principle of heating by electromagnetic induction.
    - 6.2. Applications of electromagnetic induction heating.
        - 6.2.1. Melting pot induction furnaces for metals.
        - 6.2.2. Channel induction furnace for melting metals.
        - 6.2.3. Deep heating by electromagnetic induction. Cross-flow heating.
        - 6.2.4. Surfacing.
    - 6.3. Special applications of induction heating.
7. Heating of dielectric materials.
    - 7.1. Capacitive heating.
    - 7.2. Applications of capacitive heating.

Robotics – Tiberiu BARABAŞ

1. The general structure of industrial robots.

2. Basic kinematic computations used in the control of industrial robots
3. Basic control methods of industrial robots.
4. Modeling of the outside environment of an industrial robot.
5. Industrial robots programming.
6. Integration of industrial robots in flexible systems/manufacturing cells.

Organizational culture – Rica IVAN

1. Basic concepts of organizational behavior (organizational society, organizational man).
2. Formal and informal structures in the organization: individual, group, department, organization.
3. Forms and structures of the organization.
4. Structures and institutional networks
5. Leadership styles.
6. Motivation in the organization.
7. Organizational culture. Models and typologies in the organization culture.
8. Attitudes and behavior: Structure of Attitudes.
9. Organizational behavior in the modern approaches of the organization.
10. Defining elements of socio-technical-economic organizations.
11. Relationship between man and socio-technical-economic organization.
12. Socio-technical-economic organizations - characteristics.
13. The model of the social man, the model of the self-actualized man, the complex man model.
14. Organizational behavior in the modern approaches of the organization.

Quality management – Liliana MĂGDOIU

1. Concepts
2. Personalities and standards
3. Principles, methods and tools
4. Approach to management structures
5. Customer satisfaction
6. Role of employees
7. Continuous improvement
8. Relationships with suppliers
9. Quality management systems
10. Applying quality standards
11. Efficient maintenance
12. Audit

Economic Legislation – Anca PĂCALĂ

1. Legislation on the commercial and production functions of the electrical, electronic and energy units.
2. Commercial contracts - definitions, conditions. Commercial sale and purchase contract. Transport contracts Intermediation contracts. Deposit contract.
3. Contracts for execution of works, services and cooperation Design, technical assistance, engineering and consultancy contracts; Entrepreneurial contract; Service and service contract.
4. Association and design contracts.
5. Procurement of goods and services by the state units: procedures for awarding the contract, evaluation of tenders and award of contracts.
6. Competition law: unfair competition, anticompetitive practices, economic concentration.
7. Payment and payment instruments: check payment order, documentary receipt, documentary letter of credit, bill of exchange, other payment instruments.
8. Legislation related to the research and development function: intellectual property-copyright and its protection; the license agreement, the know-how contract.
9. Licenses, authorizations and accreditations in the electricity sector.

International management – Liliana MĂGDOIU

1. Introduction in international management
2. International commerce

3. International economic cooperation
4. Financial exchange relationships
5. Foreign investments
6. The state in economic international relationships

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

Management of product research and development – Marius ROMOCEA

1. Product design process
2. Company strategy
3. Identifying consumer needs
4. Product planning
5. Principles of new product development
6. Creativity-heart of product design
7. Design specification
8. Functional modeling of products
9. Conceptual design
10. Product architecture
11. Product styling
12. Concept testing

Project management basis – Liliana MĂGDOIU

1. Project proposal development
2. Managerial evaluation of the project
3. Reporting project results
4. Drafting the technical report
5. Research results and intellectual property

Human resources management – Liliana MĂGDOIU

1. Introduction in human resources management
2. Human resources planning
3. Job design
4. Staff recruitment and selection
5. Payroll systems
6. Selection interview
7. Employer motivation
8. Employee benefits
9. Labor contract

Practice for diploma project development –

Energetics surse – Mircea PANTEA

1. Introduction and presentation of the objectives pursued. Types of energy and their efficiency.
2. Solar energy
3. Solar cells, Concentration of solar radiation, Solar energy conversion
4. Wind energy
5. Developing wind engineering
6. Wind generators. Basic principles
7. Energy of seas and oceans
8. Geothermal energy
9. Geothermal systems
10. Hydrogen
11. Fuel cells
12. Thermoelectric conversion
13. Nuclear energy
14. Current state of installation of nuclear power plants

Using electrical energy – Livia BANDICI

1. General concepts of the use of electrical energy.
2. Production of bright radiation.
3. Light sources.
    3.1. Incandescent lamp.
    3.2. Reflector incandescent lamp (RIL).
    3. 3. Halogen incandescent lamps (HIL).
    3.4. Sources of light with discharges.
        3.4.1. Low pressure mercury metal discharge lamp.
        3.4.2. High pressure mercury vapor lamp. High pressure mercury lamp and fluorescent balloon.
        3.4.3. High pressure mercury vapor discharge lamp and metal halides.
        3.4.4. Mixed light lamp.
    3.5. Lamps with high pressure sodium metal vapor discharges.
    3.6. Light sources with gas discharge.
    3.7. LED light sources.
4. Bodies and equipment used in lighting systems.
5. Electrical welding of metals.
    5.1.Welding processes.
    5.2.Manual arc welding with wrapped electrode.
    5.3.Electric arc welding in controlled atmosphere with fused electrode.
    5.4.Electric arc welding in a controlled atmosphere.
    5.5.Electric arc welding in a controlled atmosphere with a non-flammable electrode.
    5.6.Covered electric arc welding with fused electrode.

Industrial management – Liliana MĂGDOIU

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