



# INDUSTRIAL D E S I G N ENGINEERING







ordinary differential equations and the structure of their solutions, the most basic concepts of linear algebra and the vector geometry of the three-dimensional Euclidean space. The core material also examines the structure of the convergence concept of the n-dimensional Euclidean space and the differential calculus of multivariable functions, geometric questions related to smooth curves and surfaces, the description of the basic concepts of mathematical statistics and construction of regression lines.

### 3 Ecology RMKOK1ATNC

*Dr. Bayoumi Hamuda Hosam Eldin A.F. associate professor*

The students will get an overview of the interpretation of the environmental liability of geology: the science of geology is a science that deals with Earth as a whole and the habitat of living creatures. The course also describes the composition (materials), build-up (structure) and evolution (past) of the Earth's crust, general and structural geological basics, mineralogy and petrography: the causes of the occurrences of raw materials. Other main topics belonging to this subject are geological analysis, evaluation and finite quantity of raw materials, mineral wealth management and need for mineral wealth protection, the interpretation and analysis of the rational utilization rate of raw materials and energy forms. The students will also have the chance to study about the forecast and assessment of environmental damage occurring during the mining of raw materials, the methods of recultivation, researching environmental raw materials, and environmental geological forecast and mapping the complex geological environmental potential.

### 4 Technical Chemistry I. RMTMK1ATNC

*Dr. Cecília Tamás-Nyitrai E. college associate professor*

The aim of the course is to learn the basic knowledge related to the structure, properties and transformations of chemicals. The properties and reactions of material are discussed from the formation of individual atomic and molecular structure, through chemical bonds and interactions to the characterization of homogenous and heterogeneous clusters. Furthermore, the students are familiarized with the grouping, production and most important areas of applications of elements and inorganic compounds. In the practical classes the students practise how to solve the most important calculations related to the topic of inorganic chemistry (writing and ordering reaction equations on the basis of oxidation numbers, stoichiometry, calculating the concentration of solutions, conversion of concentration units, gas laws).

### 5 Physics I. RMKFI1ATNC

*Dr. Lóránt Szabó senior lecturer*

The students will get a deep insight into division of physics, physical quantities, optics (light reflection and refraction, optical devices), mechanics of liquids and gases (hydrostatic pressure, Bernoulli's equation). The course also examines basics of acoustics (sound intensity level, Doppler effect), basics of relativistic physics (mass growth, mass-energy relationship), thermodynamics (state equation of ideal gases, special changes of state and their description).

### 6 Physics II. RMKFI2ATNC

*Dr. Andrea Paukó senior lecturer*

In the focal point of the subject there are topics such as molecular heat theory: state equation of ideal gases, major terms of thermodynamics, heat propagation, Carnot cycles, basics of electrodynamics, charges at rest and moving charges. The students will be given the opportunity to study about alternating and direct current, Maxwell's equations, introduction to atom physics: basic concepts of quantum mechanics, photoelectric effect, uncertainty relation and nuclear physics: Bohr's atomic model. The course also covers the structure of the atomic nucleus, relationship between mass defect and binding energy, the mechanism of atomic fission, the operating principle of nuclear power plants, radioactive decays and their lawfulness.

### 7 Technical Mechanics I. RMKME1ATNC

*Dr. Lóránt Szabó senior lecturer*

During the semester the major issues contain STATICS introduction, scalars and vectors, vectors in 3-D, static equilibrium for a particle moment of a force, equivalent force systems: distributed loads, equilibrium of rigid bodies and the analysis of trusses, internal forces, dry friction, belts, and centre of gravity. The students will also get a thorough notion of STRENGTH OF MATERIALS, linear-elastic response and factor of safety, the way how materials carry load, area moment of inertia, pure bending, shear stress in beams, beams with axial loads, torsion, stress-element and plane stress. The core material also examines DYNAMICS, rectilinear motion, curvilinear motion, and rectangular coordinates, normal and tangential coordinates, and equation of motion for a particle: Newton's 2nd law, the work-energy relation, the

linear impulse-momentum relation and the angular impulse-momentum relation. Kinematics of rigid bodies, relative motion of points on a rigid body, instantaneous centre of velocity, mass moment of inertia, and work-energy relation for a rigid body will be introduced as well.

#### 8 Technical Mechanics II. RMKME2ATNC *Dr. Lóránt Szabó senior lecturer*

During the semester the major issues contain STATICS introduction, scalars and vectors, vectors in 3-D, static equilibrium for a particle moment of a force, equivalent force systems: distributed loads, equilibrium of rigid bodies and the analysis of trusses, internal forces, dry friction, belts, and centre of gravity. The students will also get a thorough notion of STRENGTH OF MATERIALS, linear-elastic response and factor of safety, the way how materials carry load, area moment of inertia, pure bending, shear stress in beams, beams with axial loads, torsion, stress-element and plane stress. The core material also examines DYNAMICS, rectilinear motion, curvilinear motion, and rectangular coordinates, normal and tangential coordinates, and equation of motion for a particle: Newton's 2nd law, the work-energy relation, the linear impulse-momentum relation and the angular impulse-momentum relation. Kinematics of rigid bodies, relative motion of points on a rigid body, instantaneous centre of velocity, mass moment of inertia, work-energy relation for a rigid body will be introduced as well.

#### 9 Electrotechnics RMKEL1ATNC *András Ménesi technical assistant lecturer*

The goal of the subject is to expanding the students' technical approach, acquire electrotechnical knowledge and practising it in the laboratory, during which students get an overview of the operation of electrical equipment, DC circuits, electric field (capacitors), magnetic field (induction), single phase alternating current (RLC circuits), producing 3-phase voltage and its characteristics. During the semester they will learn about star and delta connection, the basics of electronics, semiconductor devices (diodes, thyristors, etc.), the operation of transistors, their types, characteristics and basic circuits. Other major materials to study include the use of semi conductors in circuits, rectifier and amplifier circuits, electric machines, the operation and use of electric machines.

#### 10 Functional Modelling RTSFM1ATNC *Dr. Gabriella Oroszlány senior lecturer*

The course covers the concept of modelling, models, simulation of function, proportional simulation, dynamic scale models, law of similarity and analysis in sustainable respect through design. The students will also get a thorough understanding of decomposition of models to basic geometric forms, their presentation and study of their features, design of new models from the basic geometric forms (penetration analysis), introducing to spacial geometry, representations of spacial formations and elements, perspective representation: geometric redact of models of 1, 2 and 3 landmarks and redact of wall-view figures modelling the reality.

#### 11 Environmental Studies RMKKT1ATNC *Márta Soós-Berecz technical assistant lecturer*

The students will be given the opportunity to familiarise themselves with the concept, aims, elements of environmental protection, environmental impacts of anthropogenic origin, the tools of environment protection, the history of environmental protection, its role these days, principles of environmental law, conditions of sustainability and the concept of the ecological footprint.

They will also examine development stages of the global Earth system, the major geochemical cycles, the biosphere as a global ecosystem, the composition, structure of the atmosphere, the local and global consequences of air pollution, the importance of hydrosphere for wildlife and society, the formation of soils, their general characteristics and basic functions.

## ECONOMICAL AND HUMAN KNOWLEDGE

#### 12 Economics I. GGTKG1ATNC *Dr. András Medve associate professor*

Main guidelines of the subject are the following: an introduction to economics, scarcity and efficiency, the three main



concepts of economics organization, consumer behaviour, the optimal choice of the consumers and price elasticity of demand. In the framework of this subject the students are also presented consumer surplus, manufacturers' behaviour, company and enterprise, production function, production costs, short and long-term cost functions. The course covers the profit, market structures, offer of companies in perfect competition, long-term supply. Profit maximization of monopoly and oligopolies.

The students will examine market of input factors, labour market, capital market, stock market, property market and externalities.

### 13 Economics II. GGTKG2ATNC

*Dr. András Medve associate professor*

In the focal points of the subject there are topics such as macroeconomics and its interrelations, actors, output and income, measurement of the macroeconomics performance, macroeconomics cycle, consumption and saving function, demand on the capital market and multiplier effect.

The students will also have the chance to study equilibrium income, macro demand, labour market and employment, macro supply, economic equilibrium, the modern money and banking system. Other major materials contain economic growth, conjuncture, inflation and unemployment, the role of the state in economy, fiscal and monetary policy and international trade policy.

### 14 Business Economics I. GSVVG1ATNC

*Dr. György Kadocsa associate professor*

The core material of the course contains the purpose of the economic and business environment, business-types, construction of individual and collective enterprises operating characteristics, value-creating processes in businesses, general characteristics of firms producing products and services. The main topics related to the subject include profile, operating performance capacity, lead time, production systems, organizational forms and applications, main features of the single-line and multi-line organization and management.

### 15 Business Economics II. GSVVG2ATNC

*Dr. György Kadocsa associate professor*

The students will be given the opportunity to familiarise themselves with competitive activities, marketing the business, market strategy, resources used in the value-creation process, utilization and economy of means, human resource requirements planning, management and governance issues. The course covers costing basics, cost planning and calculation, ecology and measurement, investment in the venture and economically analyzing investments. Other major topics to examine are production management and economics, financial and earnings position of the company management, logistics activities and controlling.

### 16 Management GVMME1ATNC

*Dr. István Szűts associate professor*

The students will get an overview of acquiring management theory and practice, self-management, development of leaders' personality characteristics, managerial-organizational knowledge, learning methods and techniques for applying these. The subject also includes development of interpersonal communication skills necessary for managerial activity, mechanisms of decision, problem –solving techniques and their correct application.

### 17 Law for Engineers RTTKJ1ATNC

*Dr. Livia Kokas Palicska associate professor*

In the focal point of the subject there are materials like public law (constitutional law, administrative law), civil law (property law, contract law, and corporate law), copyright protection, inventions and patents and legal fundamentals related to undertakings, corporate law. The course also covers environmental protection, safety at work (safety and fire protection), copyright (invention, patent, and trademark), the task and tools of consumer protection, consumer rights, consumer protection laws, guarantees and warranties.

The students will get a notion of commercial law fundamentals related to the sale of light industry products, market control, the obligation to disclose information, forms of disclosure, giving information related to products, labelling light industry products, the characteristics of consumer contracts and competition law. During the semester they will meet Product Liability Act, the legal regulation of commercial advertising activities, the regulation of the Commercial Advertising Act and advertising monitoring procedures.

**18 Project Management RTSPM1ATNC**  
*Dr. Áron Takács college associate professor*

In the industrial, - and service activities and in the business sphere there is a huge number of tasks in which it is a must to prepare a new product or design a service using the finite resource to a given schedule. These types of projects need the use of new approach, concrete methods and techniques. In this explanation the project management is a new discipline. The topics of the subject help how to realize the projects defined with different aims strategy oriented, how to handle the emerging uncertainties and risks and how to find solutions with the help of organization-management, technological-technical and economic knowledge.

**19 Marketing and Trade I. RTTMK1ATNC**  
*Dr. Livia Kokas Palicska associate professor*

The students will get a deep insight into the basic concepts of marketing, the concept of the marketing mix, Maslow's hierarchy of needs, the economic characteristics of the sectors of the light industry, the elements of the product, price, communication and distribution policy. They will also learn marketing strategy decisions when introducing new products, fashion marketing, product features and benefits, innovation, intelligent and high-tech materials. Other major materials to study include intellectual property, concept of invention, patent, trademark, know-how, industrial design protection, licensing, franchising, brand decisions, trademarks, distinctive markings, and manufacturer's and commercial trademarks in the light industry. The course also covers the services of the Hungarian Intellectual Property Office, designing advertising for the distribution of new products, advertising goals and tools, pricing strategy and sales promotion methods. During the semester the students will deal with the practice of selling in retail, personal selling, the basic principles of business ethics, the concept of sustainable development, fair trade, shaping the conscious consumer attitude and the methods of market research. In the focal point of the subject there are topics like the rules of editing questionnaires, market segmentation, primary and secondary sources of information for designers for market research, forms of concentrated markets, the stock market, trade fairs and auctions. Other major guidelines are exhibitions, introduction of innovation opportunities (Hungarian Association for Innovation, Wamp, etc.), and communication in international trade, the characteristics of foreign cultures and the role of non-verbal signs during business meetings.

**20 Marketing and Trade II. RTTMK2ATNC**  
*Dr. Livia Kokas Palicska associate professor*

In the framework of the subject the students are presented current situation of the light industry, textile and garment industry, leather and footwear industry, paper and packaging industry, international outlook, trends in the industry, the future of the industry and economic opportunities in the light industry. Other main topics belonging here are foreign trade transactions, simple and special commodity and service transactions, barter and compensation, re-export, transit operations, the role of lease work in the manufacturing sector and the participants in the sales channel. The students will study about traders trading in their own name on their own account, in their own name on others' account, in others' name on others' account, role of commission agents, grouping of securities, methods of payment used in foreign trade. The core material is divided into cheque and draft, methods of payment from the point of view of the seller's security in international trade, letters of credit, documentary collection and its variations, conventions in transport, INCOTERMS, consumer protection (Consumer Protection Law), the basic rights of consumers, product safety and compliance, Product Liability Law and mystery shopping.

## **BASICS OF PROFESSION**

**21 Structures of Materials I. RTSAS1MTNC**  
*Dr. habil. Judit Borsa professor*

During the semester the students will acquire the knowledge of materials structures overview (levels of material structures, the features of constructions building on each other, the possibilities of influencing), processing of test results (statistical characteristics, estimates and distributions), characterization of metallic structures (crystal structures, properties of metals, effects of alloying and heat treatment). They will also examine characterization of fluids (mechanical properties and typical tests of fluids), qualitative characterization of visco-elastic materials (qualitative identification, modelling of deformation components), systemization of mechanical basic tests, presentation of stress forms and evaluation of tensile strength charts. Other major materials to study include air humidity, moisture content of materials, vapour permeation, basic tests of light industry products (permeation, moisture, absorption), interpretation of the membrane in material structures, material properties connected to electromagnetic waves and electricity (light, UV chargeability, conductivity).



**22 Structures of Materials II. RTSAS2ATNC**  
*Dr. Tibor Gregász associate professor*

The students will get a deep insight into the recognition of light industry materials (morphology, solution tests; thermal, flammability, spectral tests), the phenomenon of friction (Coulomb, Euler, dry-, fluid friction, interfacial friction, lubrication possibilities), material content and evenness (length, area and volume density and the basics of the statistical description of fluctuations, influencing evenness). The course also covers heat-related properties of polymers and their changes, structure of polymers, their typical temperatures, thermodynamic bases, moisture related characteristics (moisture regain of materials, its measurement, change, the effect of air moisture), fundamentals of composites (the purposes and possibilities of pairing qualities, typical composites) and deterioration mechanism (wear, corrosion, aging of polymers, other degradation effects).

**23 Machines of Industrial Technologies I. RTTIT1ATNC**  
*Dr. Gabriella Oroszlány senior lecturer*

The students will acquire general knowledge of mechanics, basic concepts, basic volumes, operating principles, equations, study of machines commonly occurring in industrial technologies – typical parameters, operating principles, structural design, machine selection criteria, calculations and tests related to operation. The students will examine the tested machine types: lifting machines, transport machines, drives, vehicles, water machines (different types of pumps), fans (axial, radial,) compressors, refrigerators (absorption, compressor), paper industry machines: general structure, screen section, press section, dryer section, winding, calenders, packing machines: operations of machine packaging. They will also get a deep insight into automatic solutions of packaging systems, feeding equipment types, groupings, packaging machines, development, design, construction and installation of packaging lines in plants, packaging machine technologies and constructions (unit load generators, strapping machines, shrink and stretch wrapping machines.)

**24 Machines of Industrial Technologies II. RTTIT2ATNC**  
*Dr. Gabriella Oroszlány senior lecturer*

In the focal point of the subject there are issues like textile industry machinery: the machines of producing yarns and threads, machines for producing non-woven textiles, textile industry definitions: defining the amount of twist, breaking ""km"", finishing machinery: finishing textile products, dyeing special textile machinery. The students will get an overview of the production equipment and technology of spinning and ropes, spatial density, determining thickness, material and air ratio determination, special garment finishing: garment welding, laser cutting, etching technology, pneumatic and actuating cam control of automated sewing machines, paper production technology and machines.

**25 Technical Drawing and Documentation RMKMR1ATNC**  
*Dr. Rita Boda-Kendrovics senior lecturer*

During the semester the students will be informed about the planar representation of spatial formations, drawing techniques, the general requirements of technical drawing, technical representation, projections, using line types, views, sections and segments. The course also covers symbolic and simplified representation, giving measurements; measurement, shape and position tolerances, surface roughness, drawings of structures and systems, computer aided drawing and planning, the purpose, levels and content of designing.

**26 Machine Structures RMKGM1ATNC**  
*Dr. Rita Boda-Kendrovics senior lecturer*

The subject deals with the different types of machine elements and machine structures present in the majority of modern machines, their features and the principles of their design in the following areas: basic concepts, the purpose and types of sizing, bindings, stands, springs and tribological basic concepts. The students will be given the opportunity to meet sliding and rolling-contact bearings, shafts and rolling parts, mechanical drives (friction, belt, chain, cogwheel and hybrid drives), mechanisms and closure (pipes, pipe fittings, tanks, sealing).

**27 Informatics I. RMTIN1ATNC**  
*László Kiss college associate professor*

In the focal point of the subject there are the components of the computer, its operation, Neumann principles, data representation, arithmetic, structure/function of processors, operation of serial, parallel, USB ports and operation of printers, scanners. Other topics belonging here are operation of monitors, storage media, optical storage, mass storage

devices, classification of software, program development systems, user systems, and Windows applications: Office suite (Word, PowerPoint, and Excel) and the description of Maple mathematical software package. The course also covers types of viruses, their operation and identification, network basics: network communication, TCP/IP protocol and Internet applications.

### 28 Informatics II. RMTIN2ATNC

*Dr. Kornélia Ambrus Somogyi associate professor*

The students will learn about the basics of programming, tools describing algorithms, preparing algorithms, programming languages, the classification of programming languages, object-oriented programming and the basics of Visual Basic programming. Other main materials to study are the basics of web programming, web page making, basics of database management, normalization, description of Ms Access, description of SQL language, introduction to multimedia: basics of image processing, video processing and audio processing and computer graphics.

### 29 Informatics Laboratory RMTIN3ATNC

*Dr. Kornélia Ambrus Somogyi associate professor*

In the focal point of this course there are topics like MS Word (mail merge, styles, templates and links), MS Excel (search and financial functions, database management, reports, solver, etc.) preparation of algorithms, programming basics, database design and normalization. The course also covers creating tables, setting keys, contacts, selection and crosstab queries, compilations, parameterized queries, action queries, creating forms and reports.

### 30 CAD/CAM I. RMTCA1ATNC

*Dr. Kornélia Ambrus Somogyi associate professor*

In the framework of this subject the students are presented computer aided technologies, the partial technologies comprising CAD, the system of computer-aided technologies, the position of CAD/CAM, the hardware and software requirements of computer design environment, graphics, computer modelling: the shape model, curve, surface and body modelling procedures. Other main topics belonging here are the role of realistic display in technical design systems, interoperability between different systems, standard data exchange formats, the data formats necessary for production, solution of tasks from conceptual modelling to tool making, the role of realistic display in technical design systems, the basic knowledge of the graphic design of composition tasks and visual image elements.

### 31 CAD/CAM II. RMTCA2ATNC

*Dr. Kornélia Ambrus Somogyi associate professor*

During the practice one independent computer design task must be solved. The solved task must be presented personally in the 14th week session according to the timetable. The mark consists of the submitted practical task and the evaluation of the student's activity in class.

### 32 Theory of Design I. RTSTE1ATNC

*Dr. Zoltán Koczor professor*

Midyear mark is given if the student's attendance meets the requirements of TVSZ (code of studies and exams); if the student submits the tasks required in the practice completely as well as reaches the pass level in the one in-class test (minimum 40% so not mark "1"). The midyear mark comprises the submitted tasks with 1/3 weighing, the result of the in-class test with 2/3 weighing, and together evaluated by a mark given in the range 1 to 5.

### 33 Drawing and Colour Studies I. RTRRS1ATNC

*Edit Csanák DLA senior lecturer*

The main guidelines of the course are the establishment and development of drawing skills, the proportional representation of three-dimensional objects and the human figure, techniques and tools, rhythm exercises, composition editing, the various graphical representations of object compositions, linear and tonal drawings. The students will have the chance to meet drapery and still life, understanding the anatomical structure of the human body, skeleton and muscle studies, the scaled, individual and aesthetic representation of designs, and the role of colour in the compositional representation of objects.

Other main issues belonging here are colour mixing, the visual dimensions of colour, tone series, colour wheel, notable

colour contrasts, pattern editing and processing, and presentation techniques of finished works, possible solutions for preparing these works for exhibition.

#### 34 Drawing and Colour Studies II. RTTRS2ATNC

*Edit Csanák DLA senior lecturer*

In the focal point of the subject there are the style variations of object representation, still life - colour, shape, surface representation, transformation / colour technique, colour dynamics, colour functions, colour harmonies, profession-specific representations of objects and materials, applied graphic knowledge and the proportional representations of the human body. The course also covers group compositions with graphite and colourful technical solutions, stylized representation of figure, the study of complex ways of representation, preparation of documentation and preparing the graphics for an exhibition.

#### 35 Aesthetic Modelling RTTMO1ATNC

*Ágnes Szűcs honorary associate professor*

The students will get an overview of developing through exercises the vision and skills that help to form the optimal shape, the concept and types of product model, the study of natural and geometric forms by the analysis of the components, creating simple 3D forms from basic elements and exploring the regularities. The course also covers spatial ratio system, balance, rhythm, experimenting with the plasticity and spatiality of different kinds of materials according to functions, the methods of the perspective representation of space, application areas, and planning processes by combining the form and colour functions, by emphasizing the special needs of professional areas.

#### 36 Visual Communication RTTVI1ATNC

*Ágnes Szűcs honorary associate professor*

The students will be given the opportunity to familiarise themselves with the significance of aesthetics, semantic communication through images, the forms of the visual conveyance of meaning, creativity and visual thinking based on freehand drawing, practising the different graphical methods, genres, techniques and introducing the possibilities of graphic design. Other major materials include the psychological context of vision, basic concepts of aesthetics, personality-colour-style, depiction of garments, accessories, and product packaging, representations of material surfaces, structures and patterns, plain and spatial composition tasks.

The students will also examine the development of individual visual expressions, style exercises, the concept, content and form elements of corporate identity, corporate identity and image, corporate identity and corporate design, the main aspects of designing the information system, designing corporate identity through group projects and documentation.

#### 37 Colour Studies and Colorimetry I. RTTSZ1ATNC

*Ágnes Szűcs honorary associate professor*

The students will get basic notions of colour theory, the physical, physiological and psychological bases connected to colours. They will study the spectrum of electromagnetic radiation, optical radiations, the structure of the human eye, photoreceptors, the structure of the retina, the general context of visual performance, the basics of colour vision, the properties of colour perception, and colour features.

The course also covers the factors influencing colour sensing, the methods and tools of colour communication: the questions of subjective and objective colour characterization; colour systems, colour sample atlases and the basic principles of colour systems. Other main materials related to the subject are the bases of colour measurement, the objective modelling of reduced colour vision, the methods and instruments of colour stimulus measuring, spectrophotometers, colour contrasts, colour harmony systems, the effects and functions of colours, colourful environment.

The students will also have the chance to study about the basics of colour dynamic design, the relationships of people and colours, the special characteristics of colour usage, the questions of colour reproduction, reproducible colour ranges, and colourful techniques.

#### 38 Form Design I. RTTFO1ATNC

*Dr. habil. Márta Kisfaludy associate professor*

During the semester the subject deals with establishing the creative design approach necessary for the design of industrial products, the interpretation of the concept of design from the designer's point of view, knowledge of the qualities of different types of trade-specific materials and experimentation with their shape forming possibilities. The

students will also learn innovative experiments of creating spatial forms, module structures, connection regularities, the ratio systems, size and material qualities as well as further development possibilities of leather, paper, plastic and textile spatial structures, functionality and visualisation.

**39 Form Design II. RTTFO2ATNC**  
*Dr. habil. Márta Kisfaludy associate professor*

The course covers establishing the creative design approach necessary for the design of industrial products, the interpretation of the concept of design from the designer's point of view, study of natural and geometric forms by the analysis of the components, creating simple 3D forms from basic elements, exploring the regularities. The students will acquire knowledge of the qualities of different types of trade-specific materials and experimentation with their shape forming possibilities, get to know and analyse technical, structural, functional and aesthetic solutions through 2D and 3D compositing exercises.

The course covers the role of information-exploration in the process of industrial design, design basics (principles, processes and functions of industrial design, the connection between design and image design), product design: design study basics, dominant shape characteristics, the aesthetic and technical interpretation and planning of dimensions. The core material also deals with innovative experiments of creating spatial forms, planning processes by combining the form and colour functions, by emphasizing the special needs of professional areas.

**40 Art Studies RTTMI1ATNC**  
*Ágnes Szűcs honorary associate professor*

This subject examines art as part of visual culture, art in prehistoric times, in ancient Egypt and Mesopotamia, the ancient Greek and Roman art, the art of the early medieval times, Byzantium and the Migration Period, The Romanesque and Gothic art. The course also covers the art of the Renaissance, Baroque and Rococo art, art in the 19th century, (classicism, romanticism, historicism, impressionism, post-impressionism, secession), art in the 20th century (avant-garde art movements, fauvism, expressionism, cubism, futurism, surrealism, geometric abstraction, functionalism, modern architecture, post-modern, action art).

**41 Ergonomics RTTER1ATNC**  
*Dr. Gabriella Oroszlány senior lecturer*

In the focal point of this subject there are topics such as the concept, purpose and development stages of ergonomics, the man - product (machine) system, anthropometric knowledge, the use of anthropometric data in design, physiological and psychological bases of ergonomics: vision, hearing, smell, touch perception and memory. Other major issues to deal with are product ergonomics, the user base, designer approaches, the ergonomic quality of the product, ergonomic criteria, biomechanical bases, human power and applying torque.

The students will also deal with design for special groups, (significantly different from the average, restricted) user groups for, process of product development, user involvement in product development, the ergonomics of product usage, product informatics, advertising, packaging, the ergonomic aspects of creating documentation accompanying the product, environmental ergonomics and ergonomic design of work environment.

**42 Consumer Protection RTTFO1ATNC**  
*Dr. Lívía Kokas Palicska associate professor*

Teacher's signature is awarded if the student's attendance meets the requirements of TVSZ (code of studies and exams), if the student submits the tasks required in the practice completely as well as reaches the pass level in the one in-class test (minimum 40%, so not mark „1" (fail)). The exam is in written form. If the student reaches 40% of the score given for all of the tasks, the exam paper is acceptable.

**43 Integrated Management Systems I. RTSIR1ATNC**  
*Dr. Zoltán Koczor professor*

Teacher's signature is given if the student's attendance meets the requirements of TVSZ (code of studies and exams) and reaches the pass level in the in-class test (minimum 40%). The in-class test consists of test questions and essay questions as well as calculations; the acceptable level is 40% of the score given for the totality of tasks. The exam is taken in written form (test and essay type questions) and in the form of calculations. If the student reaches 40% of the score given for all of the tasks, the exam paper is acceptable, and it is evaluated by a mark given in the range 1 to 5.

**44 Integrated Management Systems II. RTSIR2ATNC**  
*Dr. Zoltán Koczor professor*

In the framework of this subject the students are shown the principle of environmental management systems, their operation conditions, (the expectations of ISO 14000 standard and EMAS), the types and characteristics of quality management systems, the integration of systems, (standards and philosophies, ISO 9001, TQM, 6-sigma, quality awards, ISO/TS 16949, etc.), other systems (HACCP, GMP, GLP accredited laboratories, environmental management systems, data security systems, etc.). The students will also get a deep insight into quality improvement based on self-assessment (quality awards, evaluation models, EFQM), the principle of ongoing development, its implementation in various management systems, the description of company operation with indicators, establishment and operation of the monitoring system.

Other main topics belonging here are correction and prevention (data collection methods, group work with "cross-functional teams"), the concept of risks, search for causes of error, the possibilities of determining error probability, the logic of regulating processes, the specialities of regulating recurring and project processes. The course also covers the SPC logic, review of systems, the purpose of quality control audits, its process, criteria and results, the essence of certification, its process, certification standards, trade-specific management systems integrated with quality management, (trade-specific management systems integrated with quality management and modern company management systems).

## **SUPPLEMENTARY SUBJECTS**

**80 Physical Education I. GTSTESANEV**  
*Györgyné Fehér trainer*

The aim of the subject is to provide the conditions of regular sports activities for the students, to advertize the healthy way of living and to draw attention to the preventive values of physical training. Students can choose freely from the branches and courses offered by the Physical Education and Sports Institute.

**81 Physical Education II. GTSTESANEV**  
*Györgyné Fehér trainer*

The aim of the subject is to provide the conditions of regular sports activities for the students, to advertize the healthy way of living and to draw attention to the preventive values of physical training. Students can choose freely from the branches and courses offered by the Physical Education and Sports Institute.

Optional subjects

**68 3D Product Design I RTTAS1AVNC**  
*Gergely Barna visiting lecturer*

In the framework of this subject the students are presented 3D modelling, rendering, box and Spline modelling, solid and hard surface modelling, textures and materials. They will be asked to design their own model and documentation.

**69 3D Product Design II RTTAS2AVNC**  
*Gergely Barna visiting lecturer*

The students will get an overview of the possibilities of visualization of different models, usage of 3D Studio Max or Rhinoceros graphical programs based on the previous semester, adaptation of new modelling techniques, process of work, surfaces, structures, textures, shades, rendering, lightening, animation and personal designs.

**70 3D Visualization I. RTTST1AVNC**  
*Gergely Barna visiting lecturer*

In the focal point of the subject there are topics like Corel X5 and 3D Home programs, perspectives and proportions in vectorgraphic programs, drawings of furniture and fixtures, sizing of layouts and objects, architectural elements in vectorgraphic programs, presentation and sizing of viewed from above, sizing of coatings, visualization in 3D programs, designing one's own interior, documentation and presentation.

**71 3D Visualization I. RTTST2AVNC**  
*Gergely Barna visiting lecturer*

The course covers Corel X5 and 3D Home programs, visualizations of architectural and supplementary elements in interiors, presentation of viewed from above and sides, interiors of sitting rooms, kitchens, and bathrooms, visualization in 3D programs, designing one's own interior, documentation and presentation.

**72 Computer Aided Product Design RTTSTAAVNC**  
*Orsolya Nagy Szabó assistant lecturer*

The students will be given the chance to familiarise themselves with CorelDraw terminology and concepts, drawing lines, shapes and selecting object. They are expected to combine, weld, intersect, simplify and use guidelines, work with layers, fill object, use fill flyout and draw a house. Other main topics belonging here are drawing shapes: polygon, star, complex star, graph paper, spiral, using interactive tools: interactive blend, contour, distortion, drop shadow, envelope, extrude and transparency tools, drawing cogwheel and other objects with interactive tools, adding and formatting text: paragraph and artistic text, business cards, working with bitmaps, project work, and digital printing.

**73 Product Construction and Design in the Clothing Industry RTTRKAAVNC**  
*Orsolya Nagy Szabó assistant lecturer*

Students should obtain the knowledge of the process of designing a product so as to be able to work in any part of the manufacturing. The course covers product as a design task, the whole process of a product from the wide range of research work through sketches of the idea till the final presentation of the project, market analysis, basics of sociology, research work, product development (fashion, textile, leather, graphics), construction, the main features of garment industry, drawing techniques, expressions of fabric surfaces, textures and other materials. The students will be introduced proportions and movements of the human body, colour awareness and understanding of design trends. They will be expected to give a presentation of project work.

**74 Finishing RTTKIAATNC**  
*Dr. Livia Kokas Palicska associate professor*

The core material of this course includes changes and chance of the textile market in the EU The Hungarian textile and garment industry (in the past and the future), basic knowledge of textile technologies, definition of textile materials, natural fibres, man-made fibres, innovation – smart textiles, principles of fabric preparation and finishing. Other major issues belonging here are modification of fabric appearance, fundamentals of dyeing and printing, (heat printing), project work for digital printing, history of textiles technologies, trends and technologies in the textile industry, meaning of colours and digital printing on textile. They will be expected to give a presentation of project work and take a test.

## COMMON SUBJECTS OF SPECIALISATION

**45 Methodology of Product Design I. RTTTM1ATNC**  
*Dr. Zoltán Koczor professor*

The students will be given the opportunity to meet product life cycle and product environment, the structure, activity and time schedule of the product development process, product idea exploration and product definition, the characteristics, aspects and management of product development. They will also get an overview of the process of product design, process models, the methodology and rules of product design, task analysis, formulation and refinement, the list of requirements and its compilation. This subject also examines the creation, evaluation and selection of product concepts, product modelling and simulation, the product design principles and rules.

**46 Methodology of Product Design II. RTTTM2ATNC**  
*Enikő Deés DLA honorary associate professor*

In the focal point of this subject there are topics like product design as the harmonious expression of the unity of man – object - environment, product analysis and synthesis according to the consumer and producer demands, the basic design problem areas: Man and identity, Man and information, Man and environment. Man and work, Man and travelling, Man and nutrition, Man and leisure time, Man and his home. Other major materials to study include the assessment criteria



of product design: the freedom of design and the limitation of manufacturing, the visual representation of operation through the interpretation of sub-elements, designing product properties recommended for different target groups, showing psychological and sociological product features. Other main guidelines are the following: serviceability and the design of quality in accordance with the technical feature, designing with the optimal cost relative to product function and ecological functions.

**47 Integrated Product Design I. RTTTT1ATNC**  
*Dr. habil. Márta Kisfaludy associate professor*

In the framework of this course the students are presented consumer needs, survey of habits and market participants, analysis and feedback into planning, collection of information, by endorsing design principles, solution of simple design tasks individually and in group work, product modelling, presentation and evaluation and establishing the function structure.

The students will also acquire the knowledge of creation philosophy, model families, aiding design by computers, and system design ranges from the suggestion of simple problems to more complicated projects. The course focuses on the preparation of functional prototypes according to the design tasks.

**48 Integrated Product Design II. RTTTT2ATNC**  
*Dr. habil. Márta Kisfaludy associate professor*

The course covers consumer needs, survey of habits and market participants, analysis and feedback into planning, by endorsing design principles, solution of simple design tasks individually and in group work, product modelling, presentation and evaluation, colour and form, colour and ergonomics, colour harmonies and colour dynamics design. The students will also get an overview of the cooperation of designers and manufacturers, the cost factors of designing, the criteria of product features with individual, series and mass products as well as production management, design for manufacturability, standardization of types (standardization), designing collections, and model families.

They will also examine supporting design with applied computer technology, CAD, CAM basic knowledge and their industry-specific applications: ready-to-wear clothing, printing, packaging industry, machine industry, goods protection and the design methodology of its tools (package design), the design process of ready-to-wear products from fibres to finished products, and systemic design ranges from the suggestion of simple problems to more complicated projects. The course focuses on product development in team work primarily by helping the preparation of functional prototypes according to the plans.

**49 Integrated Product Design III. RTTTT3ATNC**  
*Dr. habil. Márta Kisfaludy associate professor*

The students will have a thorough notion of recycling-reuse-redesign, ecological approach in product design, and the experiments of colour and design studies aim at the diverse presentation of product variants through a design project. The integrated product design on the basis of socio-economic and technical aspects lays great emphasis on the unified and coordinated display of products and product groups in addition to the functional, market, long standing, and safety and feasibility aspects. The implementation of product design and development projects is aided by the preparation of prototypes and technological model experiments.

The most optimal creation of aesthetic product appearance is assisted by the product construction knowledge and the current state of the art industrial background. The students will study collection planning, product line planning, complex designer's approach and methodology of design.

## **FASHION AND LEATHER ACCESSORIES SPECIALISATION**

**50 Garment and Leather Product Design I. RTTBT1AVNC**  
*Dr. habil. Márta Kisfaludy associate professor*

The students will be given the opportunity to familiarise themselves with the aspects of garment formation, the formation of women's and men's garments, elements, combinations, basic silhouettes, the proportions of the garment, cutting lines, colours, patterns as aspects influencing proportionality and materials of garment textiles.

This subject also focuses on types and typical shapes of skirts, trousers, dresses, coats women's and men's suits, types of design tasks, typical design elements, collection of detail variations, technological decorative solutions on product drawings, design according to article categories, creative shape experiments, drapery studies and grouping and practice of leather products. The students will also get an overview of designing small goods (key chain, purse, etc.), designing

products made with cut, fold technology (folders, car bag, ladies fashion bags, etc.), the complex design of patterns (working pattern, marking pattern, pattern for making knife, pockets, handles, lining solutions) and the basics of computer-aided pattern design.

#### 51 Garment and Leather Product Design II. RTTBT2AVNC *Ágnes Szűcs honorary associate professor*

In the framework of this subject the students are presented types of commercial collections, characteristics of their making, designing the basic wardrobe, designing the trend collection for a particular target group, analysing the connection between build peculiarities and aesthetic dressing, basic build types and designing favourable garments for them according to colour types.

The course also covers design-style consultancy, designing workwear and uniforms, fashion houses, designers, styles, Haute couture and Pret-à-porter, types of formal clothing, expectations of protocol and market research according to given criteria. The students will also be examined on compilation of bid collections, preparing documentation, description of typical kinds of footwear, the anatomy of the foot, ways of designing accessory collections, understanding the bases of computer-aided cut-pattern design, creating and organizing collections for fashion shows and applications.

#### 52 Garment and Leather Technology I. RTTRT1AVNC *Orsolya Nagy Szabó assistant lecturer*

The main guidelines of the course are the following: the structure, professional tasks and manufacturing documentation preparation of a manufacturing company, the raw and auxiliary materials of the garment industry and their relationship with the manufacturing technology, the design of products and their relationship with manufacturing technology and manufacturing preparation (editing, modelling, pattern making, and marks for further technological operations). The students will also have the chance to study about placement, preparing the placement drawing, its aspects (material proportion, pattern, structure of the fabric), the methods and tools of spreading, tailoring methods, tailoring machines and equipment, the technological process of gluing, gluing parameters, self-adhesive textiles, adhesives, machines and equipment used for gluing.

The core material also includes sewing technology, sewing machines, sewing types, stitches, decorative stitching, the quality control of garment industry products, packaging requirements, technological aspects of storage, structure and properties of rawhide, the technical process of leather manufacturing, properties of finished leather, the history and ways of leather usage, grouping, cutting of leather goods and optimal material usage and technological solutions of leather goods.

#### 53 Garment and Leather Technology II. RTTRT2AVNC *Orsolya Nagy Szabó assistant lecturer*

Understanding the relationships between the garment industry technology solutions and the decorative possibilities of garment industry products is the key to this course. The students will acquire the knowledge of processing cotton, flax, viscose and wool fabrics, processing silk, synthetic silk and wool fabrics mixed with synthetic threads, processing knitted fabrics. They will understand the possibilities of pairing materials and textiles of different properties and special characteristics, analyse the testing aspects of textiles taking the possibilities of manufacturing into account, based on the technological, economic and wearability aspects of the products.

Other major issues to study are the characteristics of wet heat treatment, their testing, pressing head covers, ironing operations, the general technological process of leather products manufacturing, the technological process of manufacturing leather garment products, the technology of fur processing and footwear products. As a summary of the studies, students have to prepare one garment product and the matching leather accessory.

#### 54 Garment and Leather Product Construction I. RTTRK1AVNC *Éva Hottó assistant lecturer*

The main topics related to this subject are construction design as part of the garment industry product design planning process, size research, size charts, sizing standards, the proportions of the human body from the point of view of garment construction, body divisions, body proportions, different body characteristics and their effects on the garment construction.

The course also covers basic construction of women's skirts, garment waist, sewn in sleeves, trousers, the principles and methods of preparing technical series, preparing dress-patterns, charts of raw size, - ready size – partial size, technical series of women's skirts, creating calculation tables and grouping of leather goods. The students will also learn types and characteristics of smaller leather goods, bags, technical leather goods, sports goods, the construction variants of leather goods, and the aspects of size definition.

**55 Garment and Leather Product Construction II. RTTRK2AVNC**  
*Éva Hottó assistant lecturer*

In the framework of this course the students are presented the types of modifying the basic constructions, basic modelling rules, the modelling methods of different part types, the modelling solutions of base garments and modelling of women's skirts. The students will get a thorough notion of the front-back formation of upper parts, relocation of forming seam, placement of cut lines, modelling different sleeve and collar solutions, modelling trousers, the basic tailoring methods of creating silhouette forms, model reconstruction on the basis of photos, the interpretation fashion graphics, product design and model drawing.

Other major materials to study include model-making and innovative experiments for the diploma work, the structure of footwear and various accessories, the types and groupings of fur ready-to-wear industry products, the basic technology and variations of making ready-to-wear products, modelling leather and imitation leather products for the thesis.

## **TEXTILES AND INTERIOR SPECIALISATION**

**56 Textile and Interior Design I. RTTTT1AVNC**  
*Ágnes Szűcs honorary associate professor*

The course covers interior design project-tasks and their computer-aided graphic presentation, the general design and safety aspects of selecting different structural materials in interior design, textile printing processes, production criteria of the patterns, transfer printing process in practice, the display of fabrics in different styles of interiors, exhibition from the realised project works, and study at the Design week programmes.

**57 Textile and Interior Design II. RTTTT2AVNC**  
*Dr. habil. Márta Kisfaludy associate professor*

The students will get an overview of furniture history, flats and their equipment from the beginning until today, historical styles, types of furniture, houses, house forms and settlement forms, styles according to lifestyle, emotions and function, the arrangement of the functional flat, and corridor spaces. The core material also examines the architectural technical drawing, projection representations, floor plan, section, view, scales, the layout of interior, closed and open spaces, furniture arrangement, the design of storage areas, ergonomics and lifestyle knowledge, the role of decoration (paintings, photos, wall decorations, plants, etc.), design of various residential functions, special spaces, according to individual needs and styles. Taking the structural characteristics and functional properties of textile and leather sheet products into account in design is really important for this subject.

The course also contains the materials available for making upholstered furniture and the basic and special design considerations of design.

**58 Textile and Interior Design Technology I. RTTTT2AVNC**  
*Éva Hottó assistant lecturer*

This subject includes the technologies used for creating the functional characteristics of the most important sheet products used in interior design, the basics and tools of leather processing technology and the production technologies of the most important textile and leather products used in interior design. In the framework of this subject the students are presented the technological operations, equipment of woven, knitted and nonwoven fabric making and those of braiding, technologies of producing ready-made table linen; coordination of raw materials, colours, patterns, forms and styles.

**59 Textile and Interior Design Technology II. RTTTE2AVNC**  
*Éva Hottó assistant lecturer*

The students will be given the opportunity to familiarise themselves with household textiles: curtains (shade structures), furniture upholstery, carpets, bathroom textiles, bed sheets/pillow manufacturing technology in practice, accessories: properties and applications of cords, piping, borders, etc., the processing options of textile and accessories on the basis of material qualities, styles and functions. The course also deals with technological decorations (gathering, creasing, quilting, embroidery, patchwork, etc.), the technologies of producing ready-made the textiles of the living space; the style coordination of colours, patterns and shapes in one project task.

**60 Textile and Interior Design Materials RTTA2AVNC**  
*Éva Hottó assistant lecturer*

The students will get a deep insight into the traditional and modern ingredients of upholstery and other textiles used in the home (jacquard, plush, chenille, alcantara upholstery, genuine leather and fabric leather, fur and fake fur, glass fibre and textile wallpaper etc), the characteristics of modern structures meeting the needs of today's sleep culture (health protection, comfort features, etc), the features of traditional and modern filling materials, feathers used in pillows and quilts. They will examine intelligent textiles, the features of foam board, foam construction used in upholstery structures, the factors constituting the value of leather suitable for upholstery making; the qualitative characteristics of upholstery leather and artificial leather, their care and cleaning.

Other major topics belonging here are basics of architecture, the properties and uses of materials used in buildings, coverings, doors and windows, etc., building engineering basics, the sizes / types / specifications of household and home accessories, light sources, lighting fixtures, the signal system of spatial representation, ergonomic sizing principles, computer-aided representation in CAD systems and preparing documentation.

**61 Textile Materials and Testing RTTA1AVNC**  
*Dr. Livia Kokas Palicska associate professor*

In the focal point of this subject there are issues like requirements regarding the laboratory testing of textile materials, sampling, the concept of weight, volume, temperature, density, viscosity, their measurement, tools, the structural characteristics of sheet products and the relationship between the production technologies. The students will also examine grouping of woven and knitted fabric, size specifications, types of household textiles, the special needs resulting from the application area, grouping of technical textiles, the requirements of textiles used in different areas, the determination of the behaviour of textiles as a result of various mechanical impacts and strength tests (tensile strength, wear resistance).

Other guidelines are the following: the quality determination of the composition of textile raw materials (burning, microscoping), the measurement methods and comparative study of the behaviour of textiles due to water, heat and air-related effects, the functioning properties of textiles (anti-static, water repellent, flame retardant, crease reduction, etc), testing the protection function of textiles (such as flame resistance, protection against electro-smog, chemical resistance) and testing the dye-fastness of textiles.

## **PACKAGING SPECIALISATION**

**62 Packaging Design I. RMTCT1AVNC**  
*Anna Tiefbrunner technical assistant lecturer*

The course covers the introduction to general issues of packaging design, introduction of the kind, types and production-conditions of paper-based packaging, sample making with modelling, plastic-based packaging design, basic design knowledge of wooden boxes, crates, the packaging design tasks in the logistics process, packaging design of a selected product, and preparation of technical documentation.

**63 Packaging Design II. RMTCT2AVNC**  
*Dr. Róbert Németh senior lecturer*

The students will get a deep insight into computer technology and their relationship, the internal and external integration of CAD, a computerized environment of design, hardware and software requirements of computer design-systems, curve and surface modelling knowledge and fundamentals of computer graphic. Other major materials to study include bitmapped graphics features and areas of application, the characteristics of vector-graphic, vector-graphic applications, opportunities of CorelDraw 12, solving of vectorgraphic tasks and digital imaging (scanning, digital photography, filming).

The students will also learn bitmap applications, CorelPhotoPaint12 and Photoshop software, photo retouching, and presentation of a CAD system: box design in computerised environment, standards and freeform modelling, output generation: tool path, photo-realistic images, 3D animations and, standard data exchange formats.

**64 Paper and Packaging Technology I. RMTPT1AVNC**  
*Dr. László Koltai associate professor*

The subject examines the history of the paper-producing, the paper industry status and future on Hungary and abroad,

manufacture of semi-paper products, paper raw material, mechanical-, thermo-mechanical semi-finished products, pulp bleaching, pulp preparation, pulp unlock, grinding, gluing, filling, colouring and paper machines. The students will be informed about paper machine types, main parts, cardboard and sheet production, paper processing, the methods of paper finishing, calenders, sheet cutting, paper processing, areas of paper processing and producing corrugated products.

**65 Paper and Packaging Technology II. RMTPT2AVNC**  
*Dr. László Koltai associate professor*

The main guidelines of this subject are packaging basic knowledge, the purpose of packaging, classification of usage, knowledge of packaging materials, paper-, glass- and plastic- based packaging materials, packaging and logistics, logistics packaging, loading units, packaging and environmental protection, Hungarian laws, waste recovery, packaging and advertisement and consumer packaging.

**66 Paper and Packaging Materials and Testing I. RMTPA1AVNC**  
*Dr. László Koltai associate professor*

The course covers paper types classification, and their main characteristics, measurement theory, the reproducibility of measurements methods, evaluation of test results, and introduction of general properties of the paper: production direction, transverse direction, sieve, the upper side, square weight, and volume weight. The students will have to understand mechanical properties of paper, stretch, expansion, fracture, laceration, methods of measuring surface hardness, gain knowledge of gluing properties, writeability, COBB, PLG, etc., advanced paper characteristics, flow, smoothness, etc., theory of measurement of optical properties, colour measurement, whiteness measurement and opacity measurements. Other major issues contain basic concepts of printing, various printing processes, structure of printing machines, text and image processing, fitment and offset-plate producing technology, technology of book-binding and bindery equipment.

**67 Paper and Packaging Materials and Testing II. RMTPA2AVNC**  
*Dr. László Koltai associate professor*

The students are expected to verify the conditions of climate-controlled paper laboratory, Measure general properties of paper, mechanical properties of paper, gluing properties of paper and optical properties of paper. They will be given introduction of printing processes: plant visit. They will have to understand technology of book-binding: factory visits.