

Óbuda University

Rejtő Sándor Faculty of Light Industry and  
Environmental Engineering



## **TRAINING PROGRAM**

**Industrial Design Engineering BSc (E)**

Budapest, 01 September 2019.

## DEGREE PROGRAM CURRICULUM

**1. Degree program name:**

Industrial Design Engineering

**2. Field of training:**

technical

**3. Language of training:**

English

**4. Training schedule(s) and duration of courses in semesters, number of contact hours:**

regular / evening / correspondence / distance training  
full time, 7 semesters, 2295 hours

**5. Optional specialties:**

Product design specialization (Interior-textile, fashion-accessories)  
Packaging design

**6. Number of credits to collect to earn degree:**

210 credits

**7. Level of qualification and professional qualification as indicated in the degree certificate:**

- level of qualification: bachelor - BSc
- professional qualification: Industrial Design Engineer

**8. Study area classification of professional qualification according to the standard classification system of training areas:**

214

**9. Educational objective:**

The aim is to train industrial product and design engineers capable to design, manufacture and distribute industrial products, particularly within an SME framework. Graduate industrial product and design engineers are technical specialists who are out-of-the-box thinkers and primarily design, manufacture and distribute durable consumer products and articles for personal use. In possession of their knowledge and skills of technology, aesthetics, humanities,

and economics, they are able to carry out independent creative work in each phase of product development; they also know the innovation process of product development, as well as the material, organizational and human resources required for product development; and they are capable to manage product lifetime cycles. They are prepared to continue their studies at a Masters course.

## **10. Professional competencies to be mastered:**

### *a) knowledge*

- Knowledge of general and specific mathematical and natural scientific principles, rules, relations, and procedures as required to pursue activities in the special field of product design.
- Knowledge of basic design principles and methods, as well as major production technology procedures and operating processes.
- Knowledge of the most important basic materials applied in the special area of product design, their production and their application criteria.
- Knowledge of basic construction designs and their dimensioning basics.
- Knowledge of the fundamental methods, rules and standards of ergonomics and psychology as required for industrial product design.
- Knowledge of the fundamental rules and technological limitations of shaping products, of striking a harmony between content and form.
- Knowledge of major analogies between natural and technical systems, and their possible applications in design.
- Knowledge of expectations and requirements prevailing in the areas of health and safety, fire protection and safety engineering as related to the relevant special field, as well as applicable environmental regulations.
- Knowledge of the basics, limitations and requirements of the special fields of marketing, management, environment protection, quality assurance, information technology, law, and economics, intrinsically linked to the special area of product design.
- Knowledge of the learning, knowledge acquisition, and data collection methods of the special field of product design, their ethical limitations and problem solving techniques.
- Knowledge of the most important practical work techniques of their special field.
- Knowledge of the historical periods, outstanding designers and characteristic objects of industrial design.
- Knowledge of the basic rules of intellectual property management.
- Knowledge of the ethics and methods of team work.

### *b) capabilities*

- Able to design the form and construction of relatively simple products by taking into account the limits of production technology, the costs expected, and impacts on the environment.
- Able to present graphical product concepts and sketches using traditional manual techniques.
- Able to perform the virtual modelling of product concepts and products using 3D computer-aided design systems as well as to produce their technical documentation.

- Able to produce, examine and test real models and prototypes using direct digital production technologies based on both traditional and 3D product models.
- Able to master new knowledge by solving practical problems empirically.
- Able to transplant solutions evolved in nature into technical practice.
- Able to apply the calculation and modelling principles and methods of special literature related to industrial product design.
- Able to interpret and characterize the structure and operation of the structural units and components of relatively simple technical systems, as well as the design and connection of the system components applied.
- Able to explore the causes of failures and to select elimination operations.
- Understand and use characteristic online and printed references characteristic of their special field, both in Hungarian and in at least one foreign language.
- Know and apply the terminology and special expressions of their professional field in Hungarian and in at least one foreign language.
- Adequate perseverance and endurance of monotony to perform practical operations.
- Able to take part in and also to manage team work.
- Able to initiate, compile, and carry out projects in team work, primarily in a multidisciplinary environment.
- Able to take into account the aspects of the historical, cultural, socio-economic and industrial environment in the process of industrial design and product development.
- Able to give reasons for the decisions related to the product designed, as well as to test them and support them by technical and standard investigation methods.
- Able to analyze design projects by applying design methods and to give methodological reasons for the workflows applied.
- Able to resolve relatively simple health and safety tasks.

*c) attitude*

- Efforts to make self-education in the special area of industrial product design a continuous process in line with professional objectives.
- Efforts to solve tasks and make management decisions by being aware of the opinions of the colleagues supervised, possibly in cooperation therewith.
- Motivated to familiarize with the latest development trends, solutions and innovations in their special field.
- Market, environment, and customer oriented.
- Committed to observe and make observe quality requirements as related to product design and development.
- Open to transmitting own knowledge to colleagues.
- Efforts to comply with legal regulations and to take the ethical rules of engineering into account during work.
- Taking care to promote subordinates' professional development, to manage and help such endeavors.
- Taking care of ensuring equal access opportunities in problem solving.
- Complying and ensuring compliance with the applicable requirement systems of security, health and safety, environment protection, quality assurance and inspection during work.

d) autonomy and responsibility

- Managing the work of the staff they are in charge of as instructed by their workplace supervisor.
- Assessing the efficiency, effectiveness and safety of subordinates' work.
- Prepared to coordinate innovation and product design processes.
- Valuing and using ideas arising at workshops and meetings as collective results.
- Prepared to find employment or launch a venture in the special field of product design.
- Acting as expected by quality and environment control systems.

## 11. Main training areas:

According to the Regulation of 18/2016. (VIII. 5.) EMMI	Credit points
Science basics (35-50 credits)	38
Economic and human knowledge (14-30 credits)	20
Professional core material (70-105 credits)	88
Specific professional knowledge (25-45 credits)	39
Optional subjects (10 credits)	10
Thesis (15 credits)	15
<b>Total:</b>	<b>210</b>

## 12. Criteria prescribed:

**Physical education:** Each regular student is required to complete two semesters of Physical education. The subject is announced in semesters 2 and 3 in the model curriculum, with a load of 2 lessons per week.

**Subjects to be completed in a foreign language:** Each regular student participating in a bachelors training course in Hungarian is required to enroll into two professional courses offered by the university in English or German as criteria subjects, and to complete the respective testing required. In the event that a student failed to complete a criteria subject in the English language, they are required to certify their basic level English skills as provided in the Study and Examination Regulations.

**Specialty language requirements:**

**Professional traineeship:**

Professional traineeship of at least six weeks, organized at a location of professional practice. Professional traineeship is included in the criteria prescribed.

## 13. Foreign language requirements (to earn the degree):

The aim of the language training at the university is to help students pass the language exam which is a training and output requirement to issue the diploma and to develop professional language skills. The requirement of issuing the diploma in the basic training is an intermediate, level B2, complex general language exam.

#### **14. Knowledge verification:**

- a) during the study period, by written or verbal reports, written (classroom) tests, by the evaluation of home assignments (designs, measurement records, etc.), mid-semester grading or signature,
- b) by preliminary examination passed in the study period,
- c) by examination or comprehensive examination passed in the examination period, and
- d) by final examination.

#### **15. Criteria for admission to a final examination:**

- a) Final completion certificate (absolutorium) granted,
- b) Thesis accepted by supervisor.

Admission to a final examination is subject to a final completion certificate being granted. A final completion certificate is issued by a higher education institution to a student who has complied with the study and examination requirements prescribed in the curriculum and completed the professional traineeship required – except for meeting the foreign language requirement and completion of the thesis –, and has acquired the credits prescribed.

#### **16. Parts of the final examination:**

The final examination consists of defending the thesis and oral examinations taken on the subjects prescribed in the curriculum (time allowed for preparation: at least 30 minutes per subject), to be passed by the student consecutively within the same day. Subjects (subject groups) comprising, in the aggregate, a body of knowledge corresponding to at least 20 and up to 30 credit points may be designated for the final examination.

The list of questions of the oral examination is made available to candidates 30 days before the date of the final examination.

Candidates may start the examination if their thesis has been accepted by the final examination board with at least sufficient (2) qualification. Criteria for correcting a failed thesis are defined by the competent institute.

#### **17. Result of the final examination:**

The weighted average of the grades of the degree project / thesis and the oral part of the final examination – taking into consideration the number of subjects included in the final examination – as follows:

$$Z = (SZD + Z1 + Z2 + \dots + Zm) / (1 + m).$$

**18. Criteria for issuing a diploma:**

- a) Successful final examination,
- b) Compliance with the foreign language requirement.

**19. Dual training option: -**

**20. Cooperative training option:**

Cooperative training is a voluntary supplementary practice module linked to a regular bachelors training course at the university, in the framework of which the university and a business company, firm or institution cooperate in order to enable university students to acquire professional experience as specified in the educational objective.

21. Date of entry into effect: 01 September 2019.

Dated in Budapest, 31. 08. 2019.

Dr. habil Koltai László

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# CURRICULUM





Code	Subject	Wb	Cr	semester										Prerequisite Code												
				1.		2.		3.		4.		5.			6.		7.									
				lec	gs	lab	reg	Cr	lec	gs	lab	reg	Cr	lec	gs	lab	reg	Cr	lec	gs	lab	reg	Cr			
<b>Subjects of Specialization 25-45kr</b>				34	39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	
41.	RTXTT1EBNE	4	5																							
43.	RTETT1EBNE	4	6																							
44.	RTXEO1EBNE	4	4																							
45.	RTXEO1EBNE	4	4																							
46.	RTWST1EBNE	2	2																							
47.	RTWST2IBNE	4	4																							
48.	RTWST3IBNE	4	4																							
49.	RTXAK1EBNE	4	4																							
50.	RTWMT1IBNE	2	2																							
51.	RTPPM1IBNE	2	4																							
<b>Optional subjects **</b>				10	70																					
52.	Optional subjects I.																									
53.	Optional subjects II.																									
54.	Optional subjects III.																									
55.	Optional subjects IV.																									
56.	Optional subjects V.																									
<b>RTDSIEBNE Thesis</b>				15																						
<b>Mindösszesen:</b>				176	210	27	30	29	34	25	33	26	31	25	28	23	26	21	21	21	20	13	23	13	20	
<b>Total weekly hours:</b>				108		15	20	14	20	14	25	14	26	12	25	12	23	13	21	20	13	23	13	20	20	
<b>Rate of practical hours (%)</b>				61																						
<b>Examination (v)</b>						2	2	2	2	2	2	3	3	3	3	2	2	2	1	1	2	2	2	1	1	
<b>Practice mark (é)</b>						6	7	7	7	7	7	7	7	6	6	5	5	3	3	3	5	5	3	3	3	
<b>Patronage lesson</b>						0	1	0	0																	
<b>Physical education I.</b>				2	0																					
<b>Physical education II.</b>				2	0																					
<b>Criteria subjects I.</b>																										
<b>Criteria subjects II.</b>																										
<b>Internship</b>				6	het																					

Subject of the final exam:

- Methodology of product design, Design, Ergonomics
- Professional technology and design skills

Dr. habil. Koltai László  
 Dekán

Course coordinator: Dr. habil. Koltai László

Semester, weekly hours (Wh)\*, requirements (req)\*\* credits (Cr)

\* lecture (lec), group seminar (gs), lab

\*\* v – examination, é – practice mark, s – course examination, e – acceptance

Code	Subject	Wh	Cr	Semester												Prerequisite Code					
				1.		2.		3.		4.		5.		6.			7.				
				lec	gs	lab	reg	Cr	lec	gs	lab	reg	Cr	lec	gs	lab	reg	Cr			
<b>Subjects of Specialization 25-45kr</b>																					
42.	RTWT2PBNE	4	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	
43.	RTXTC2EBNE	4	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	
44.	RMWCT1EBNE	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	
45.	RMWPT1EBNE	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	
46.	RMWPT2EBNE	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	
47.	RMWPT3EBNE	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	
48.	RMWPA1EBNE	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	
49.	RMWPA2EBNE	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	
50.	RMWKC1EBNE	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
51.	RTFPM1PBNE	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	
<b>Optional subjects **</b>																					
<b>Total:</b>				10	10				0	2	0	4	0	0	0	0	0	0	0	0	6
52.	Optional subjects I.			0	2	0	0	0	2												
53.	Optional subjects II.			0	2	0	0	0	2												
54.	Optional subjects III.																				
55.	Optional subjects IV.																				
56.	Optional subjects V.																				
<b>RTDSDIEBNE Thesis</b>																					
<b>Mindösszesen:</b>				176	210				28	33	28	33	25	28	21	24	21	21	21	21	28
<b>Total weekly hours:</b>				108				28	28	28	25	25	25	28	21	24	21	21	21	21	28
<b>Rate of practical hours (%)</b>				61				13	13	14	15	15	11	11	11	11	11	11	11	11	20
<b>Examination (v)</b>								2	2	2	2	3	3	3	2	2	2	2	2	2	1
<b>Practice mark (é)</b>								6	7	7	7	8	5	5	5	5	5	5	5	5	3
<b>Patronage lesson</b>								0	1	0	0	0	0	0	0	0	0	0	0	0	0
<b>Patronage lesson</b>								0	1	0	0	0	0	0	0	0	0	0	0	0	0
<b>Physical education I.</b>								0	2	0	0	0	0	0	0	0	0	0	0	0	0
<b>Physical education II.</b>								0	2	0	0	0	0	0	0	0	0	0	0	0	0
<b>Criteria subjects I.</b>								0	2	0	0	0	0	0	0	0	0	0	0	0	0
<b>Criteria subjects II.</b>								0	2	0	0	0	0	0	0	0	0	0	0	0	0
<b>Internship</b>				6	hét	0															

Subject of the final exam:

- Methodology of product design, Design, Ergonomics
- Professional technology and design skills

Dr. habil. Koltai László  
Dokán

# SUBJECT DESCRIPTIONS

<b>Title of the course:</b> <b>Mathematics I.</b>	<b>NEPTUN-code:</b> NMXAN1EBNE	<b>Weekly teaching hours:</b> $l+cw+lb$ 3+3+0	<b>Credit:</b> 6 <b>Exam type:</b> e examination
<b>Course leader:</b> Aurél Galántai PhD	<b>Position:</b> professor	<b>Required preliminary knowledge:</b> -	
<b>Curriculum</b>			
The goals of this course are: introduction of basic concepts of the real line, the complex plane and the three-dimensional space; development of differential and integral calculus with the help of the concepts of sequences, real functions, convergence and continuity to the level of practical applicability in further engineering / mechanical / physical studies. Introduction to the application of program MatLab.			
<b>Professional competencies:</b>			
<ul style="list-style-type: none"> <li>- The student knows the general and specific mathematical principles, rules, correspondences and methods used in light industry engineering.</li> <li>- Familiar with the learning methods and problem solving technics used in light industry engineering.</li> <li>- He/she is able to demonstrate clearly the mathematical results, principles and their consequences.</li> </ul>			
<b>Literature</b>			
1. Thomas – Weir – Hass: Thomas’ Calculus, 13e, Pearson, 2013.			
2. Anton – Bivens – Davis: Calculus, 10e, Wiley, 2012.			
3. Anton – Rorres: Elementary Linear Algebra, 11e, Wiley, 2013.			
Comment:			

<b>Name of subject:</b> <b>Mathematics II.</b>	<b>NEPTUN code:</b> RKXMA2ABNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 2+3+0	<b>Credit: 6</b> <b>Requirements:</b> examination
<b>Course coordinator:</b> Henry González Mastrapa PhD	<b>Title:</b> college professor	<b>Prerequisite:</b> Mathematics I. sign	
<b>Subject content:</b>			
Introduction of complex numbers. The most important types of ordinary differential equations and construction of their solutions. Basic concepts of linear algebra. Vector geometry of the 3-dimensional euclidean space. Convergence in n-dimensional euclidean spaces. Differential calculus of functions in several variables. Geometrical problems connected to smooth curves and surfaces. Basic concepts of mathematical statistics. Construction of the line of linear regression.			
<b>Competences to be mastered:</b>			
a) knowledge - Knowledge of general and specific mathematical and natural scientific principles, rules, relations, and procedures as required to pursue activities in the special field of product design.			
<b>Bibliography:</b>			
1. Anton, H., Rorres, C.: Elementary Linear Algebra with Applications, 9e, Wiley, 2005, ISBN: 0-471-66959-8.			
2. Thomas, G.B. et al.: Thomas' Calculus, 11e, Addison-Wesley, 2005, ISBN: 0-321-18558-7.			
3. Scharnitzky V. (szerk) Matematikai feladatok, Tankönyvkiadó, 1989.			

<b>Name of subject:</b> Environmental Studies	<b>NEPTUN-code:</b> RKXKT1ABNE	<b>Number of hours:</b> lec+gs+lab 2+0+0	<b>Credit: 3</b> <b>Requirements:</b> examination
<b>Course coordinator:</b> Konrád Lájér PhD	<b>Title:</b> associate professor	<b>Prerequisite:</b> -	
<b>Course Description</b>			
<p>The purpose of the course in environmental engineer training is to review the basic knowledge about elements of environmental system, the basic environmental concepts, to disclose antropogenous effects those influence unfavourable way the state of environment. Reviewing basic principles which can be used for diminishing unfavourable effects that influence environmental systems, to familiarize requirements that are necessary in favour of sustainability. Types of environmental harms, the process of contamination. Causes of global issues, their effects and possibilities of reducing. Means which are used for enhancing the effectiveness of environmental protection: ecological footprint calculation, lifecycle analysing, eco-label. Characterize biotic and abiotic factors of ecological system, importance of biological-geochemical cycles research. Features, harms and protection of atmosphere, hydrosphere and litosphere. Specific effects of noise and vibration caused by human activities and its alleviating possibilities. Reviewing elements of waste management pyramid. Application effects of different types of energy sources.</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge</p> <ul style="list-style-type: none"> <li>- Knowledge of general and specific mathematical and natural scientific principles, rules, relations, and procedures as required to pursue activities in the special field of product design.</li> <li>- Knowledge of expectations and requirements prevailing in the areas of health and safety, fire protection and safety engineering as related to the relevant special field, as well as applicable environmental regulations.</li> <li>- Knowledge of the basics, limitations and requirements of the special fields of marketing, management, environment protection, quality assurance, information technology, law, and economics, intrinsically linked to the special area of product design.</li> </ul> <p>b) capabilities</p> <ul style="list-style-type: none"> <li>- Able to design the form and construction of relatively simple products by taking into account the limits of production technology, the costs expected, and impacts on the environment.</li> </ul> <p>c) attitude</p> <ul style="list-style-type: none"> <li>- Market, environment, and customer oriented.</li> <li>- Complying and ensuring compliance with the applicable requirement systems of security, health and safety, environment protection, quality assurance and inspection during work.</li> </ul> <p>d) autonomy and responsibility</p> <ul style="list-style-type: none"> <li>- Acting as expected by quality and environment control systems.</li> </ul>			
<b>Bibliography</b>			
1. Visualizing Enviromental Sience, 4th 2014, Wiley			
2. PPS file sin moodle and recomendad literure sources			

<b>Name of subject:</b> <b>Chemistry</b>	<b>NEPTUN-code:</b> RMXCA1BBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 2+0+2	<b>Credit: 5</b> <b>Requirements:</b> examination
<b>Course coordinator:</b> Tamás Csiszér PhD	<b>Title:</b> assistant lecturer	<b>Prerequisite:</b> -	
<b>Subject content:</b>			
<p>The subject summarizes general and inorganic chemistry for engineers working in practice. The subject underlines the connection between material structure and material properties. This subject gives a base of other disciplines, like physics and other material knowledge etc..</p>			
<b>Competences to be mastered:</b>			
<ul style="list-style-type: none"> <li>– Knowledge of general and specific mathematical, natural and social scientific principles, rules, relations, and procedures as required to pursue activities. Comprehensive knowledge of the basic features and interrelations of environmental elements and system. Knowledge of the main methods to examine the quantity and quality features, their typical measuring instruments and limitations thereof, as well as methods for the evaluation of data measured.</li> <li>– The subject performs basic tests of the quantity and quality characteristics and systems by state-of-the-art measuring instruments; to draw up and implement measurement plans; and to evaluate data.</li> <li>– Chemistry solves tasks of water, soil, air, radiation, and noise protection, as well as of waste treatment and processing at proposal level; to participate in preparing decisions; to perform authority audits; and to take part in the operation of these technologies.</li> <li>– The subject is able to reveal deficiencies in the technologies applied and process risks and to initiate mitigation measures after getting familiarized with the technology concerned.</li> </ul>			
<b>Literature</b>			
1. N. Akhmetov: General and Inorganic Chemistry, MIR Publishers, Moscow, 1983			
2. A. Pahari, B. Chauhan: Engineering Chemistry, Infinity Science Press LLC, Hingham, Massachusetts, New Delhi, India, 2007			



<b>Name of subject:</b> <b>Physics I.</b>	<b>NEPTUN-code:</b> RKXF11ABNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 1+1+0	<b>Credit: 3</b> <b>Requirements:</b> practice mark
<b>Course coordinator:</b> Sándor Pekker PhD	<b>Title:</b> research professor	<b>Prerequisite:</b> -	
<b>Curriculum</b>			
<p>Dividing of physics. Physical quantities. Optics (light reflection and refraction, optical devices). Mechanics of liquids and gases (hydrostatic pressure, Archimedes's principle, equation of continuity, Bernoulli's equation). Basics of acoustics (speed of sounds, sound intensity level, Doppler effect, Mach number). Basics of relativistic physics, Einstein's special theory of relativity (velocity transformation, increase of mass, mass-energy relationship). Thermodynamics. Thermal expansion of solids and liquids. State equation of ideal gases, special changes of state and their description. Heat. Laws of thermodynamics. Special processes. Thermal conduction. Heat engines.</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge - Knowledge of general and specific mathematical and natural scientific principles, rules, relations, and procedures as required to pursue activities in the special field of product design.</p>			
<b>Bibliography:</b>			
1. Serway Jewett: Physics for Scientist and Engineers			
2. Lóránt Szabó: Physics for Undergraduate Students			
3. www.physicsclassroom.com			

<b>Name of subject:</b> Physics II.	<b>NEPTUN-code:</b> RKXFI2ABNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 1+1+0	<b>Credit:</b> 3 <b>Requirements:</b> examination
<b>Course coordinator:</b> Sándor Pekker PhD	<b>Title:</b> research professor	<b>Prerequisite:</b> Physics I.	
<b>Curriculum</b>			
<p>Dividing of physics II. Laws of thermodynamics. Special processes. Molecular heat theory. Thermal propagation. Heat engines (Carnot, Otto, Diesel). Basics of electrodynamics. Charges at rest. Moving charges. Alternating and direct current. Maxwell's equations. Introduction to atom physics: basic concepts of quantum mechanics. Photoelectric effect. Uncertainty relation. Nuclear physics: Bohr's atomic model. 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.</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge - Knowledge of general and specific mathematical and natural scientific principles, rules, relations, and procedures as required to pursue activities in the special field of product design.</p>			
<b>Bibliography:</b>			
1. Serway Jewett: Physics for Scientist and Engineers			
2. Lóránt Szabó: Physics for Undergraduate Students			
3. www.physicssclassroom.com			

<b>Name of subject:</b> <b>Technical mechanics</b>	<b>NEPTUN-code:</b> RKXME1EBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 2+2+0	<b>Credit: 5</b> <b>Requirements:</b> practice mark
<b>Course coordinator:</b> Lóránt Szabó PhD	<b>Title:</b> assistant lecturer	<b>Prerequisite:</b> -	
<b>Curriculum</b>			
<p>Our study of engineering mechanics can be divided into 4 main parts:</p> <ol style="list-style-type: none"> <li><b>1. Statics.</b> Basic concepts, fundamentals. Planar forces, force systems. Moment of force about a given point and axis. Planar supports. Loads on beams. Centre of gravity. Friction. Free-body, shear force and bending moment diagrams for the beams.</li> <li><b>2. Strength of Materials.</b> Basic concepts, stress and stress states. Material Laws. Stress strain diagram. Simple strain of prismatic bars. Stress theories. Tensile, shear and torsion stresses.</li> <li><b>3. Kinematics.</b> The kinematics of a point. Basic concepts of kinematics. Uniform and uniformly changing motion. Projectile motions, circular motion, harmonic motion, swinging motion. Kinematics of rigid body.</li> <li><b>4. Kinetics.</b> Point kinetics. Newton's laws. Momentum, power, work. Energies (potential, kinetic). Work energy theorem. Oscillation motion. Simple pendulum. The kinetics of a rigid body. The moment of inertia, and general theorems and principles. The rotation of a rigid body around an axis. Translational and plane motion of a rigid body.</li> </ol>			
<b>Competences to be mastered:</b>			
<p>a) knowledge</p> <p>- Knowledge of general and specific mathematical and natural scientific principles, rules, relations, and procedures as required to pursue activities in the special field of product design.</p>			
<b>Bibliography:</b>			
1. Serway Jewett: Physics for Scientist and Engineers			
2. <a href="http://www.icivil-hu.com/Civil-team/2nd/Statics/Statics,%20R.C.%20Hibbeler,%2012th%20book.pdf">http://www.icivil-hu.com/Civil-team/2nd/Statics/Statics,%20R.C.%20Hibbeler,%2012th%20book.pdf</a>			
3. <a href="https://www.youtube.com/watch?v=l_M2TImYe64">https://www.youtube.com/watch?v=l_M2TImYe64</a>			

<b>Name of subject:</b> <b>Electrotechnics</b>	<b>NEPTUN-code:</b> RKXEL1EBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 2+1+0	<b>Credit:</b> 4 <b>Requirements:</b> practice mark
<b>Course coordinator:</b> Sándor Pekker PhD	<b>Title:</b> research professor	<b>Prerequisite:</b> -	
<b>Curriculum</b>			
<p>Production and features single-phase alternating current. Peak and RMS value. The coil and the capacitor AC circuit. RLC circuits. AC power, power factor correction. Production of three-phase voltage. Three-phase networks. Star and delta. Transformers operating principle, equivalent circuit, operating conditions. The transformer structure. Special transformers. The basics of electronics. Semiconductor devices. The diode characteristics, application areas. Rectifier circuits. Special properties diodes. Power supplies. The thyristor, triac and diac structure, characteristic curves and application areas. Transistors construction, operation, characteristic curves. Amplifier basic circuits. The transistor switching operation. Amplifier circuit features. Operational Amplifiers construction, operation modes. Oscillators. Multi Plate. Operating principles, structure, replacing the coupling of the asynchronous machine. The single-phase asynchronous motor. Operating principle, starting torque and asynchronous machines. Principle of operation of DC machines, excitation solutions and operational features.</p>			
<b>Competences to be mastered:</b>			
<ul style="list-style-type: none"> <li>- In possession of state-of-the-art IT skills, being able to use professional databases and certain design, modelling, and simulation softwares depending on their specialty.</li> <li>- Efforts to improve knowledge by on-going self-education and continuously update their knowledge of the world.</li> <li>- Responsible proclamation and representation of the value system of the engineering profession; openness to professionally well-founded critical remarks.</li> <li>- Sharing experiences with colleagues, thus promoting their development.</li> </ul>			
1. Valery Vodovozov: Introduction of to Electronic Engineering, 2010. <a href="http://bookboon.com">http://bookboon.com</a> ; ISBN: 978-87-7681-539-4			
2. Don Johnson: Fundamentals of Electrical Engineering I, Connexions , 2010; <a href="https://cnx.org/contents/d442r0wh@9.72:g9deOnx5@19/Themes">https://cnx.org/contents/d442r0wh@9.72:g9deOnx5@19/Themes</a> ; 1999-2018, Rice University; ID: 778e36af-4c21-4ef7-9c02-dae860eb7d14@9.72			
3. John A. I. E. E. Henderson: ELECTROTECHNICS, WENTWORTH Press, 2016. aug. 25. - 188 pages, ISBN: 1362012750, 9781362012757			

<b>Name of subject:</b> <b>Discriptive geometry</b>	<b>NEPTUN-code:</b> RTXAG1BBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 1+0+2	<b>Credit: 3</b> <b>Requirements:</b> practice mark
<b>Course coordinator:</b> Gabriella Oroszlány PhD	<b>Title:</b> assistant lecturer	<b>Prerequisite:</b> -	
<b>Subject content:</b>			
<p>Knowledge of the essential technical –and design principles, methods and relationships: basic concepts of the plan and the space geometry.  Modes of representation: 1 Perspective 2 Axonometry.  Monge’s multi-view representation.  Representation of polyhedra, intersecting a polyhedron with a line or planes, intersection.  Representation of solids of revolution, their intersection with a line, with planes, intersection.  Image plane transformation, rotation, surface development.  Application of computer-aided graphic systems for the display of the constructions.</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge  - Knowledge of general and specific mathematical and natural scientific principles, rules, relations, and procedures as required to pursue activities in the special field of product design.</p> <p>b) capabilities  - Able to design the form and construction of relatively simple products by taking into account the limits of production technology, the costs expected, and impacts on the environment.</p>			
<b>Bibliography:</b>			
1. Dr. Szunyogh G.: Ábrázoló geometriai szerkesztések – OE - BGK - Elektronikus Jegyzet			
2. Bársony I.: Műszaki ábrázoló geometria. Szega Books Kft. Pécs 2008			
3. Fóris T.: A műszaki rajz alapjai. Síkmértan 2006			
4. <a href="https://elearning.uni-obuda.hu/">https://elearning.uni-obuda.hu/</a> electronic notes and aids prepared by the instructor			

<b>Name of subject:</b> Macroeconomics	<b>NEPTUN-code:</b> GGXKG1EBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 2+0+0	<b>Credit: 2</b> <b>Requirements:</b> <i>practice mark</i>
<b>Course coordinator:</b> András Medve PhD	<b>Title:</b> associate professor	<b>Prerequisite:</b> -	
<b>Subject content:</b>			
<p>Introduction to Macroeconomics and National Income Accounting. The MPS and the SNA-system. Gross Output, GDP, GNI, NDP, Nni, GNDI, NNDI. The Determination of National Income. The Circular Flow. The Consumption Function. The Investment Demand. Money and Modern Banking. Money and its Functions. The Monetary Base and the Money Multiplier. Commercial Banks and the Central Bank. Equilibrium in the Financial Markets. Money and Inflation. The Cost of Inflation. The Government in the Circular Flow. The Government Budget. Monetary and Fiscal Policy. Lorenz Curve and the Gini Coefficient. Economic Growth and the Business Cycle. International trade and Commercial Policy. Absolute and Comparative Advantage in the World Trade. The Components of the Balance of Payments</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge - Knowledge of the basics, limitations and requirements of the special fields of marketing, management, environment protection, quality assurance, information technology, law, and economics, intrinsically linked to the special area of product design.</p> <p>b) capabilities - Able to initiate, compile, and carry out projects in team work, primarily in a multidisciplinary environment.</p>			
<b>Bibliography:</b>			
1. Begg, David et al. Economics. McGraw-Hill Edition, 2014.			
2. Peter Jochumzen: Essentials of Macroeconomics. 2010. <a href="http://www.bookboon.com">www.bookboon.com</a>			
3. Ian Jaques: Mathematics for Economics and Business, Addison-Wesley			

<b>Name of subject:</b> Microeconomics	<b>NEPTUN-code:</b> GGXKG2EBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 1+1+0	<b>Credit: 2</b> <b>Requirements:</b> <i>practice mark</i>
<b>Course coordinator:</b> András Medve PhD	<b>Title:</b> associate professor	<b>Prerequisite:</b> -	
<b>Subject content:</b>			
<p>The Tools Of Economic Analysis. The Market. Demand, Supply and Equilibrium. Free Markets and Price Controls: Price Ceilings and Maximum Prices. Price Elasticity Of Demand, Cross-elasticity of demand, Income-elasticity. The Theory Of Consumer Choice. Complements and Substitutes. Business Organization and Behaviour. The Firms Production Decision. Production costs. Type of Business Organizations. Market Structures and Measurement of Market Power: Herfindahl, CR and Lerner-index. Perfect Competition and Pure Monopoly. Monopolistic Competition. Oligopoly. Game-theory and interdependent Decision. Nash- Equilibrium. Dominant Equilibrium. The Analysis of Factor Markets: Labour Market. Human Capital. Capital Markets. Rentals, Interest Rates and Assets Prices. Net Present Value.</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge - Knowledge of the basics, limitations and requirements of the special fields of marketing, management, environment protection, quality assurance, information technology, law, and economics, intrinsically linked to the special area of product design.</p> <p>b) capabilities - Able to initiate, compile, and carry out projects in team work, primarily in a multidisciplinary environment.</p> <p>c) attitude - Market, environment, and customer oriented.</p>			
<b>Bibliography:</b>			
1. Ian Jaques: Mathematics for Economics and Business, Addison-Wesley			
2. David Begg, Stanley Fischer, Rudiger Dornbusch: Economics, Third Edition			
3. Kristen Ahlersten. Essentials of Microeconomics. 2008. www.bookboon.com			

<b>Name of subject:</b> Enterprise Economics (blended)	<b>NEPTUN-code:</b> GSEVG2QBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 2+2+0	<b>Credit:</b> 4 <b>Requirements:</b> examination
<b>Course coordinator:</b> Péter Szikora PhD	<b>Title:</b> assistant lecturer	<b>Prerequisite:</b> -	
<b>Subject content:</b>			
<p>The aim of the course is for students to acquire knowledge which will enable them to deal with economic and financial problems from a corporate point of view. Students are introduced to the concepts of enterprise, objectives, business environment, business forms, value creation, production processes, organizational forms, strategy creation and corporate marketing. Students also gain an insight into the development of enterprises, different development strategies, problems of growing, optimal operational size and various other essential aspects of managing a corporation.</p> <p>The aim of the course is to further develop the students' basic business and economic knowledge and thinking, keeping the practical requirements in mind, with appropriate theoretical knowledge acquisition. Students are introduced into company asset management, labor management issues, cost management, cost accounting methodology, analysis of the economics of investments and the basics of corporate finance. Students also gain an insight into basic marketing concepts and methods.</p>			
<b>Bibliography:</b>			
1. Kadocsa, Gy. (2007): Entrepreneurial Management. Amicus Press, Budapest – München			
2. Spinelli, S., Adams, R. (2011): New venture creation: Entrepreneurship for the 21st Century. McGraw-Hill Education			



<b>Name of subject:</b> <b>Basics of Management</b>	<b>NEPTUN-code:</b> GVXMA1QBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 1+1+0	<b>Credit: 3</b> <b>Requirements:</b> examination
<b>Course coordinator:</b> Bianka Parragh PhD	<b>Title:</b> assistant lecturer	<b>Prerequisite:</b> -	
<b>Subject content:</b>			
<p>Management as a scientific discipline (theories and waves). Content of the managerial activity, skills and tasks. Decision like the centre of the managerial activity. Decision theories. Relationship of the leader and employees. Leadership styles and typology of the leadership. The organizations, structures (organogram) and characteristics. The successful and effective managers. Fields of management: strategic-, project-, innovation-, and marketing management, TQM. Environmentally friendly management. Deal and handle the problems, conflicts, crisis management. Goals for the Human Resource Management (recruitment and selection). Corporate culture and identity. Self management, communication skills, personality tests. Creation, creativity techniques. Case studies from the fields of decision, responsibility, emotions, moral. Recruitment and selection, demonstration of a job interview.</p>			
<b>Bibliography:</b>			
1. Dr. Bianka Parragh (2011): "Management" – digitally available textbook of theory and practice, Óbuda University, VMI			
2. Montana P. J. – Charnov B. H. (2008): Management, Barron's Educational Series			
3. Manfred Kets de Vries (2006): The leadership mystique – Leading behavior in the human enterprise, Prentice Hall			
4. Derek Rowentree (2006): The manager's checklists, Pearson Prentice Hall			

<b>Name of subject:</b> <b>Design (online)</b>	<b>NEPTUN-code:</b> RTEDE1EBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 2+0+0	<b>Credit: 2</b> <b>Requirements:</b> practice mark
<b>Course coordinator:</b> Dóra Papp-Vid DLA	<b>Title:</b> assistant lecturer	<b>Prerequisite:</b> Art studies	
<b>Subject content:</b>			
<p>Historical periods, objects, creators of design. Efforts, possibilities of the designers in the past and today. The fundamental principles of design. The functions of design, the process of design on the part of the designer. Industrial revolution. Art Deco- Jugendstil-Art Nouveau. Functional design.</p> <p>Progressive and conservative modernism. Design after the First World War. Avantgarde, constructivism, Bauhaus. Art Deco in Europe and in America. The American model of commercial design. European design after the Second World War. Design in the second half of the twentieth century. Organic design. System-oriented design. Design trends at the beginning of the twenty first century.</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge</p> <ul style="list-style-type: none"> <li>- Knowledge of basic design principles and methods, as well as major production technology procedures and operating processes.</li> <li>- Knowledge of the most important basic materials applied in the special area of product design, their production and their application criteria.</li> <li>- Knowledge of basic construction designs and their dimensioning basics.</li> <li>- Knowledge of the fundamental rules and technological limitations of shaping products, of striking a harmony between content and form.</li> <li>- Knowledge of major analogies between natural and technical systems, and their possible applications in design.</li> <li>- Knowledge of the learning, knowledge acquisition, and data collection methods of the special field of product design, their ethical limitations and problem solving techniques.</li> <li>- Knowledge of the historical periods, outstanding designers and characteristic objects of industrial design.</li> </ul> <p>b) capabilities</p> <ul style="list-style-type: none"> <li>- Understand and use characteristic online and printed references characteristic of their special field, both in Hungarian and in at least one foreign language.</li> <li>- Know and apply the terminology and special expressions of their professional field in Hungarian and in at least one foreign language.</li> <li>- Able to take into account the aspects of the historical, cultural, socio-economic and industrial environment in the process of industrial design and product development.</li> </ul>			
<b>Bibliography:</b>			
1. Korona Péterné, Szűcs Ágnes: A bútortörténet és a design nagy korszakai. ÓE-RKK 6063, Budapest, 2015.			
2. Ernyey Gyula: Design. Tervezéselmélet és termékformálás 1750-2000, Dialóg Campus Kiadó, Bp.-Pécs, 2000			
3. Dr. Slézia József: Kortárs nemzetközi design. Designtrend Kft., 2013.			
4. Zalavári József: A forma tervezése. Designökológia. Scholar Kiadó, 2008.			

5. Sparke, Penny: Design. Mesterek és mesterművek. Athenaeum, Budapest, 2000.

6. <https://elearning.uni-obuda.hu/> electronic notes and aids prepared by the instructor

<b>Name of subject:</b> <b>Consumer protection</b>	<b>NEPTUN-code:</b> RTXFV1BBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 2+0+0	<b>Credit:2</b> <b>Requirements:</b> examination
<b>Course coordinator:</b> Tamás Csiszér PhD	<b>Title:</b> assistant lecturer	<b>Prerequisite:</b> -	
<b>Subject content:</b>			
<p>Consumer protection knowledge. Fundamental rights of consumer protection. The institutional system of consumer protection.</p> <p>The consumer protection act. Specialized commercial and legal basic knowledge. Marketing rules. Environmental regulations. Special environmentally-friendly markings, distinctive quality marks. CE marking. Product marking knowledge. Labelling. Indicating the composition of raw materials of textile products. Usage – handling instructions. Product liability. Managing customer and service complaints. The certification of compliance. The consumer advocacy organizations. Market surveillance activity.</p> <p>Case studies. Special textile industry materials testing (fastness, dimensional stability). Certification bodies, visiting testing sites.</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge</p> <ul style="list-style-type: none"> <li>- Knowledge of the basics, limitations and requirements of the special fields of marketing, management, environment protection, quality assurance, information technology, law, and economics, intrinsically linked to the special area of product design.</li> </ul> <p>b) capabilities</p> <ul style="list-style-type: none"> <li>- Able to explore the causes of failures and to select elimination operations.</li> </ul> <p>c) attitude</p> <ul style="list-style-type: none"> <li>- Market, environment, and customer oriented.</li> <li>- Efforts to comply with legal regulations and to take the ethical rules of engineering into account during work.</li> </ul>			
<b>Bibliography:</b>			
1. Fazekas Judit: Fogyasztóvédelmi jog, Bp. Coruplex Kiadó, 2007.			
2. <a href="https://elearning.uni-obuda.hu/">https://elearning.uni-obuda.hu/</a> electronic notes and aids prepared by the instructor			
3. Dr. Baranovszky Gy., Újlaki-Vázt L.: Fogyasztók miniciklopédiája, OFE, Bp., 2006.			

<b>Name of subject:</b> Engineering legal basics	<b>NEPTUN-code:</b> RTXMJ1BBNE	<b>Number of hours:</b> lec+gs+lab 2+0+0	<b>Credit:2</b> <b>Requirements:</b> examination
<b>Course coordinator:</b> Áron Takács Phd	<b>Title:</b> college associate professor	<b>Prerequisite:</b> -	
<b>Subject content:</b>			
<p>Public law (constitutional law, administrative law). Civil law (property law, contract law, corporate law) Copyright protection. Inventions and patents. Legal fundamentals related to undertakings, corporate law. Environmental protection, safety at work (safety and fire protection). Copyright (invention, patent, trademark). The task and tools of consumer protection, consumer rights, consumer protection laws, guarantees and warranties. 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, competition law. Product Liability Act. The legal regulation of commercial advertising activities, the regulation of the Commercial Advertising Act, advertising monitoring procedures.</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge</p> <ul style="list-style-type: none"> <li>- Knowledge of the basics, limitations and requirements of the special fields of marketing, management, environment protection, quality assurance, information technology, law, and economics, intrinsically linked to the special area of product design.</li> <li>- Knowledge of the basic rules of intellectual property management.</li> </ul> <p>c) attitude</p> <ul style="list-style-type: none"> <li>- Market, environment, and customer oriented.</li> <li>- Efforts to comply with legal regulations and to take the ethical rules of engineering into account during work.</li> </ul>			
<b>Bibliography:</b>			
1. Rózsáné Lupkovics M.: Gazdasági jog alapfokon, Bp., BMF. KGK. 2000.			
2. Szilner Gy. (szerk.): Gazdasági jog, Bp., Novissima K., 2008.			
3. <a href="https://elearning.uni-obuda.hu/">https://elearning.uni-obuda.hu/</a> electronic notes and aids prepared by the instructor			

<b>Name of subject:</b> Art studies	<b>NEPTUN-code:</b> RTXMT1BBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 2+1+0	<b>Credit: 3</b> <b>Requirements:</b> practice mark
<b>Course coordinator:</b> Dóra Papp-Vid DLA	<b>Title:</b> assistant lecturer	<b>Prerequisite:</b> -	
<b>Subject content:</b>			
<p>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 art of the Renaissance. Baroque and Rococo art.</p> <p>Art in the 19th century. (classicism, romanticism, historicism, impressionism, post-impressionism, secession)</p> <p>Art in the 20th century. (avant-garde art movements, fauvism, expressionism, cubism, futurism, surrealism, geometric abstraction, functionalism, modern architecture, post-modern, action art)</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge</p> <ul style="list-style-type: none"> <li>- Knowledge of the learning, knowledge acquisition, and data collection methods of the special field of product design, their ethical limitations and problem solving techniques.</li> <li>- Knowledge of the historical periods, outstanding designers and characteristic objects of industrial design.</li> </ul> <p>b) capabilities</p> <ul style="list-style-type: none"> <li>- Understand and use characteristic online and printed references characteristic of their special field, both in Hungarian and in at least one foreign language.</li> <li>- Know and apply the terminology and special expressions of their professional field in Hungarian and in at least one foreign language.</li> </ul>			
<b>Bibliography:</b>			
1. Ernst H. Gombrich: A művészet története. Glória Kiadó, Budapest. 2002.			
2. Szabó Attila: Művészettörténet vázlatokban. AKGA Junior Kiadó, Budapest. 2000.			
3. Szabó Attila: Művészettörténet képekben. AKGA Junior Kiadó, Budapest. 2001.			
4. Szűcs Ágnes: Művészettörténet. Divattörténet. Műszaki Könyvkiadó, Budapest. 2003.			
5. Bonta János: A modern építészettörténet 1911-2000. Terc Ker.Szolg. Kft. 2002.			
6. Nikolaus Pevsner: Az európai építészet története. Corvina Kiadó, Budapest. 1995.			
7. <a href="https://elearning.uni-obuda.hu/">https://elearning.uni-obuda.hu/</a> electronic notes and aids prepared by the instructor			

<b>Name of subject:</b> Structures of materials I.	<b>NEPTUN-code:</b> RMXAT1BBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 2+0+2	<b>Credit: 5</b> <b>Requirements:</b> practice mark
<b>Course coordinator:</b> Judit Borsa PhD	<b>Title:</b> professor	<b>Prerequisite:</b> -	
<b>Subject content:</b>			
<p>The students get a summary on basic chemistry based upon their high school studies (types of materials, atoms, molecules, primary and secondary bonds). Polymers as most important material for future industrial designers are presented: natural polymers, synthetic polymers (polymerization reactions, structure of polymers and their properties, polymer manufacture methods). Practice: chemical and instrumental (FTIR) analysis of polymers; microscopy, thermal analysis, chromatography, water uptake of hydrogels, evaluation of experimental data.</p>			
<b>Bibliography:</b>			
1. Kutasi Istvánné: Kémia és kémiai technológia műszakiaknak			
2. Komáromi-Kutasiné: Kémia és felületvédelmi technológiai gyakorlatok			
3. Berecz Endre: Kémia műszakiaknak			

<b>Name of subject:</b> Structures of materials II.	<b>NEPTUN-code:</b> RMXAT2BBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 2+0+2	<b>Kredit: 5</b> <b>Requirement:</b> examination
<b>Subject owner:</b> Judit Borsa PhD	<b>Rank:</b> professor	<b>Pre-requisite:</b> Structures of materials I.	
<b>Subject content</b>			
<p>The subject familiarizes the students with materials from microstructure to macrostructure, basic features, relationships, physical explanation, properties and intervention possibilities needed for the design of material parameters, and some examination procedures.</p> <ul style="list-style-type: none"> <li>• Special, moisture-related features of polymer structures. Typical features of fibres.</li> <li>• Processes and their characteristics related to moisture, moisture absorption and drying. Examinations.</li> <li>• Structure and characteristics of metals as crystalline materials. Possibilities and characteristic-modifying effects of alloying and heat treatments of metals. Basic examinations of metallic structures.</li> <li>• Basic terms of mechanical characteristics and examinations. Explanation and principles of bundle and chain in the case of mechanically collaborating systems</li> <li>• Friction and its accompaniments.</li> <li>• Explanations of ‘membrane’. Membrane structures and their importance.</li> <li>• Combination of materials. Introduction of composite structures.</li> <li>• General permeability characteristics (moisture, gas, radiation).</li> <li>• Isotropy and anisotropy. Direction-related features of 2D products.</li> <li>• Magnetic and electric features of materials.</li> <li>• Micro and nano systems. Size-determined characteristics of micro and nano range.</li> <li>• Failures. Typical failure processes of metals, polymers and composite structures.</li> </ul>			
<b>Bibliography:</b>			
1. <a href="https://elearning.uni-obuda.hu/">https://elearning.uni-obuda.hu/</a>			



<b>Name of subject:</b> <b>Machines of industrial technologies I. (blended)</b>	<b>NEPTUN-code:</b> RTXIT1EBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 1+0+1	<b>Credit: 3</b> <b>Requirements:</b> practice mark
<b>Course coordinator:</b> Gabriella Oroszlány PhD	<b>Title:</b> assistant lecturer	<b>Prerequisite:</b> -	
<b>Subject content:</b>			
<p>Machinery fundamentals, basic concepts, principles and operational requirements are closely related to the product design expertise area. Operation, development and relations of structural units and building elements of ubiquitous machines of industrial technologies and simple technical systems. Kinematic basic concepts and fundamental mechanisms. Mechanisms of degrees of freedom (DOF calculations), structural - kinematic analysis. The material processing and manufacturing process technology associated with each step of the special equipment, their structure, operating principles and basic concepts. Textile machinery, non-woven fabrics production of machines, production machines of knitted products. Finishing machines, equipments used for painting and pattern-making. Types and operating principles of equipments for carrying out the key packaging products and packaging operations. The latest development trends, solutions and innovations.</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge</p> <ul style="list-style-type: none"> <li>- Knowledge of basic design principles and methods, as well as major production technology procedures and operating processes.</li> <li>- Knowledge of the most important basic materials applied in the special area of product design, their production and their application criteria.</li> </ul> <p>b) capabilities</p> <ul style="list-style-type: none"> <li>- Able to interpret and characterize the structure and operation of the structural units and components of relatively simple technical systems, as well as the design and connection of the system components applied.</li> <li>- Able to explore the causes of failures and to select elimination operations.</li> </ul>			
<b>Bibliography:</b>			
1. Dr. Bódi B.: Ipari technológiák gépei I. (ruhaipar) elektronikus jegyzet, Óbudai Egyetem RKK Budapest, 2011			
2. Dr. Szücs I.: Ipari technológiák gépei II. (textilipar) elektronikus jegyzet, Óbudai Egyetem RKK Budapest, 2011			
3. Kerekes Titusz: Bevezetés a csomagolás technikába I.-II., Papír Press kiadó 2001			
4. Medveczkiné P.B. – Dr. Szücs I. – Szabó R. – Pataki M. – Dr. Kokasné P.L. – Sinkáné Dr. K. A.: Könnyűipari enciklopédia I/3. Textilipari technológiák, BMF. RKK. Jegyzet, 2002.			
5. Dr. Bódi B.: Ruhaiipari gépek üzemtana I.-II.-III. BMF. RKK Jegyzet, 2004.2005.			
6. <a href="https://elearning.uni-obuda.hu/">https://elearning.uni-obuda.hu/</a> electronic notes and aids prepared by the instructor			

<b>Name of subject:</b> <b>Machines of industrial technologies II. (blended)</b>	<b>NEPTUN-code:</b> RTXIT1EBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 1+0+1	<b>Credit: 3</b> <b>Requirements:</b> examination
<b>Course coordinator:</b> Gabriella Oroszlány PhD	<b>Title:</b> assistant lecturer	<b>Prerequisite:</b> Machines of industrial technologies I.	
<b>Subject content:</b>			
<p>Further machinery fundamentals, basic concepts, principles and operational requirements which are closely related to the product design expertise area.</p> <p>The material processing and basic settings of special equipment for each process step of the manufacturing process. Knowledge of the structural parts of machines (mechanical machine components, pneumatic components, etc.) will enable to understand the design and the operating principle of machines and make it possible to select the appropriate machines and equipment.</p> <p>Working principles and structural designs of the overall garment processing equipments (sewing machines, irons and glue machines, presses etc.).</p> <p>Special clothing machining: clothing welding, laser cutting, engraving technology tools, sewing machines and pneumatic cam control.</p> <p>The latest developments and innovative solutions of equipments producing packaging tools and performing packaging.</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge</p> <ul style="list-style-type: none"> <li>- Knowledge of basic design principles and methods, as well as major production technology procedures and operating processes.</li> <li>- Knowledge of the most important basic materials applied in the special area of product design, their production and their application criteria.</li> </ul> <p>b) capabilities</p> <ul style="list-style-type: none"> <li>- Able to interpret and characterize the structure and operation of the structural units and components of relatively simple technical systems, as well as the design and connection of the system components applied.</li> <li>- Able to explore the causes of failures and to select elimination operations.</li> </ul>			
<b>Bibliography:</b>			
1. Dr. Bódi B.: Ipari technológiák gépei I. (ruhaipar) elektronikus jegyzet, Óbudai Egyetem RKK Budapest, 2011			
2. Dr. Bódi B.: Ruhaipari gépek üzemtana I.-II.-III. BMF. RKK Jegyzet, 2004.2005			
3. Kerekes Titusz: Bevezetés a csomagolás technikába I.-II., Papír Press kiadó 2001			
4. <a href="https://elearning.uni-obuda.hu/">https://elearning.uni-obuda.hu/</a> electronic notes and aids prepared by the instructor			

<b>Name of subject:</b> <b>Technical drawing and documentation</b>	<b>NEPTUN-code:</b> RKXMR1EBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 1+0+2	<b>Credit:</b> 4 <b>Requirements:</b> practice mark
<b>Course coordinator:</b> Bodne Kendrovics Rita PhD	<b>Title:</b> associate professor	<b>Prerequisite:</b> -	
<b>Course Description</b>			
<p>The aim of this course is to provide an introduction to drawing fundamentals and to develop drawing skills of students. The first part of the course covers such topics as layout of Technical Drawings, line styles, lettering, scale, geometric construction, transformation, projection (ortographic projection, central or perspective projection, oblique projection), axonometric view (isometric, diametric, Cavalier etc.). The second part of the course focuses on topics as follows: sketching, dimensioning, sectioning, fits and tolerances, surfaces roughness, symbolical representation, detail and assembly drawing.</p>			
<b>Competences to be mastered:</b>			
<p>b) capabilities</p> <ul style="list-style-type: none"> <li>- Able to present graphical product concepts and sketches using traditional manual techniques.</li> <li>- Able to perform the virtual modelling of product concepts and products using 3D computer-aided design systems as well as to produce their technical documentation.</li> </ul>			
<b>Bibliography:</b>			
1. Coli H.Simmons, Dennis E. Maguire: Manual of Engineering drawing in e-learning system			
2. David Anderson: Technical drawing, Spring, 2006			

<b>Name of subject:</b> Machine elements	<b>NEPTUN-code:</b> RKEGS1ABNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 1+2+0	<b>Credit:</b> 4 <b>Requirements:</b> practice mark
<b>Course coordinator:</b> Andrea Paukó PhD	<b>Title:</b> assistant lecturer	<b>Prerequisite:</b> Technical drawing and documentation	
<b>Course Description</b>			
<p>The course aims to introduce the most basic machine parts, giving insight to the engineering speciality. The subject deals with machine parts and machine structures used in up-to-date machines, their types, properties and design principles. Main topics:</p> <p>The concept of machine elements, groups and design principles</p> <ul style="list-style-type: none"> <li>– rotating machine parts, shaft joints,</li> <li>– mechanical drives: gear drives, worm gearing, chain drive, belt drive. Principle of friction transmission,</li> <li>– brakes: structure, function and design basics,</li> <li>– supporting shafts, bearings, basic concepts of tribology</li> <li>– storage elements: pipe lines and fittings, pipe joints, valve, gate valve, check valve. Flow losses of pipe networks, characteristic curves, reservoirs and seals.</li> </ul>			
<b>Competences to be mastered:</b>			
<p>a) knowledge</p> <ul style="list-style-type: none"> <li>- Knowledge of basic design principles and methods, as well as major production technology procedures and operating processes.</li> <li>- Knowledge of basic construction designs and their dimensioning basics.</li> </ul> <p><b>b) capabilities</b></p> <ul style="list-style-type: none"> <li>- Able to design the form and construction of relatively simple products by taking into account the limits of production technology, the costs expected, and impacts on the environment.</li> <li>- Able to interpret and characterize the structure and operation of the structural units and components of relatively simple technical systems, as well as the design and connection of the system components applied.</li> <li>- Able to explore the causes of failures and to select elimination operations.</li> </ul>			
<b>Bibliography:</b>			
1. Steven R. Schmid, Bernard J. Hamrock, Bo. O. Jacobson: Fundamentals of Machine Elements, ISBN 9781439891322			
2. Machine elements, handbook, <a href="http://www.gbi.bgk.uni-obuda.hu/oktatas/segedanyagok/gepelemek/Machine_Design_2/Machine%20Element.pdf">http://www.gbi.bgk.uni-obuda.hu/oktatas/segedanyagok/gepelemek/Machine_Design_2/Machine%20Element.pdf</a>			

<b>Name of subject:</b> <b>Informatics I.</b>	<b>NEPTUN-code:</b> RMEIN1ABNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 1+0+3	<b>Credit:</b> 4 <b>Requirements:</b> practice mark
<b>Course coordinator:</b> Eszter Kormany PhD	<b>Title:</b> associate professor	<b>Prerequisite:</b> -	
<b>Curriculum</b>			
<p>The aim of the course is to form a basis of informatics for the respective university studies and for the subsequent engineering career as well. Throughout the lectures one will receive insight of the formation, development, current state and areas of development related to the science of informatics. The course covers computer architectures and the necessary hardware and software components as well as the application of the ethical and safe use. The seminars are focusing on data analysis, problem solving and building algorithms. The skills acquired thereof could be applied to solve tasks of the corresponding subjects and to professional work later on.</p>			
<b>Bibliography:</b>			
1. PPT files on the homepage of Moodle learning system			

<b>Name of subject:</b> <b>Informatics II.</b>	<b>NEPTUN-code:</b> RMXIE2KBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 0+0+3	<b>Credit:</b> 4 <b>Requirements:</b> practice mark
<b>Course coordinator:</b> Eszter Kormany PhD	<b>Title:</b> associate professor	<b>Prerequisite:</b> Informatics I.	
<b>Curriculum</b>			
<p>In the framework of the course the basics of database manipulation and programming are covered. With the aid and application of MS Access one will be able to construct and manipulate databases. The course introduces database design, normalization steps, creation of tables, setting of keys and relations. Queries and reports are also included. The use of the SQL is part of the course as well.</p> <p>The course covers the basis of programming and means of algorithm description as well as their usage. One will have the opportunity to create simple algorithms and functions for MS Office applications.</p>			
<b>Bibliography:</b>			
1. PPT files on the homepage of Moodle learning system			

<b>Name of subject:</b> <b>Colour theory and colorimetry I.</b>	<b>NEPTUN-code:</b> RTXSZ1BBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 2+0+2	<b>Credit:</b> 4 <b>Requirements:</b> practice mark
<b>Course coordinator:</b> Ákos Borbély PhD	<b>Title:</b> associate professor	<b>Prerequisite:</b> -	
<b>Subject content:</b>			
<p>Basic notions of color theory. The physical, physiological and psychological bases connected to colors. 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 color vision, the properties of color perception. Color features. The factors influencing color sensing. The methods and tools of color communication: the questions of subjective and objective color characterization; color systems, color sample atlases. The basic principles of color systems. The bases of color measurement, the objective modelling of reduced color vision. The methods and instruments of color stimulus measuring, spectrophotometers. Color contrasts. Color harmony systems. The effects and functions of colors, colorful environment. The basics of color dynamic design, the relationships of people and colors. The special characteristics of color usage. The questions of color reproduction, reproducible color ranges. Colorful techniques.</p> <p>The most important practical methods of the professional field.</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge</p> <ul style="list-style-type: none"> <li>- Knowledge of the fundamental methods, rules and standards of ergonomics and psychology as required for industrial product design.</li> </ul> <p>b) capabilities</p> <ul style="list-style-type: none"> <li>- Understand and use characteristic online and printed references characteristic of their special field, both in Hungarian and in at least one foreign language.</li> <li>- Know and apply the terminology and special expressions of their professional field in Hungarian and in at least one foreign language.</li> <li>- Able to give reasons for the decisions related to the product designed, as well as to test them and support them by technical and standard investigation methods.</li> </ul>			
<b>Bibliography:</b>			
1. Nemcsics Antal: Színdinamika. Színes környezet tervezése. Akadémiai Kiadó, Budapest, 1990			
2. Itten, Johannes: A színek művészete. Göncöl-Saxum Kiadó, Bp. 2002.			
3. <a href="https://elearning.uni-obuda.hu/">https://elearning.uni-obuda.hu/</a> electronic notes and aids prepared by the instructor			

<b>Name of subject:</b> CAD/CAM I.	<b>NEPTUN-code:</b> RTXCC1EBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 0+0+3	<b>Credit:</b> 4 <b>Requirements:</b> practice mark
<b>Course coordinator:</b> Eszter Kormány PhD	<b>Title:</b> associate professor	<b>Prerequisite:</b> Informatics I.	
<b>Subject content:</b>			
<p>Computer aided design. 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 with Illustrator and Photoshop. Computer modelling: the shape model, curve, surface and body modelling procedures. The role of realistic display in technical design systems.</p> <p>Interoperability between different systems. Standard data exchange formats. The data formats necessary for production. Solution of tasks from conceptual modelling to tool making.</p> <p>The role of realistic display in technical design systems.</p> <p>The basic knowledge of the graphic design of composition tasks and visual image elements.</p>			
<b>Bibliography:</b>			
<ol style="list-style-type: none"> <li>1. Kepes György: A látás nyelve. Gondola (1979)</li> <li>2. Monoly-Nagy László: Látás mozgásban, Műcsarnok Intermédia (1996)</li> <li>3. Adobe® Photoshop® és Illustrator® programok</li> </ol>			



<b>Name of subject:</b> CAD/CAM II.	<b>NEPTUN-code:</b> RTECC1EBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 0+0+3	<b>Credit:</b> 4 <b>Requirements:</b> practice mark
<b>Course coordinator:</b> Orsolya Nagyné Szabó PhD	<b>Title:</b> assistant lecturer	<b>Prerequisite:</b> CAD/CAM I.	
<b>Subject content:</b>			
<p>Under the course the students are introduced to the theoretical basics of computer-aided design (Adobe Illustrator and Adobe Photoshop). The use of computer applications help to practice the drafting and manipulation methods of various 2D design. During the semester students will learn how can be designed in a given topic a box plan and visualize a box with graphics and 3D renderings.</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge - Knowledge of basic construction designs and their dimensioning basics.</p> <p>b) capabilities - Able to perform the virtual modelling of product concepts and products using 3D computer-aided design systems as well as to produce their technical documentation. - Able to produce, examine and test real models and prototypes using direct digital production technologies based on both traditional and 3D product models. - Able to apply the calculation and modelling principles and methods of special</p> <p>Bibliography: related to industrial product design.</p>			
<b>Bibliography:</b>			
1. CAD rendszerek felhasználói kézikönyvei			
2. <a href="https://elearning.uni-obuda.hu/">https://elearning.uni-obuda.hu/</a> electronic notes and aids prepared by the instructor			

<b>Name of subject:</b> <b>Methodology of product design</b>	<b>NEPTUN-code:</b> RTXTM2EBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 2+0+0	<b>Credit: 3</b> <b>Requirements:</b> practice mark
<b>Course coordinator:</b> Daniella Koós DLA	<b>Title:</b> assistant lecturer	<b>Prerequisite:</b> Form design I.	
<b>Subject content:</b>			
<p>Product life cycles and product environment. Design schools. The process of product development, product definition and exploration of ideas. The optimization of product features.</p> <p>Product development concept. Product functions for industrial product design: technical (materials, technology, ergonomics), business (marketing, energy optimization, technology), psychological (effects on the consumer, security), sociology (prestige, brand), ecology (management of resources), and documentary (historical and contemporary style interpretation). The design cost factors. Design for manufacturability.</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge</p> <ul style="list-style-type: none"> <li>- Knowledge of basic design principles and methods, as well as major production technology procedures and operating processes.</li> <li>- Knowledge of the fundamental rules and technological limitations of shaping products, of striking a harmony between content and form.</li> <li>- Knowledge of the learning, knowledge acquisition, and data collection methods of the special field of product design, their ethical limitations and problem solving techniques.</li> <li>- Knowledge of the historical periods, outstanding designers and characteristic objects of industrial design.</li> <li>- Knowledge of the basic rules of intellectual property management.</li> </ul> <p>b) capabilities</p> <ul style="list-style-type: none"> <li>- Able to apply the calculation and modelling principles and methods of special Bibliography: related to industrial product design.</li> <li>- Understand and use characteristic online and printed references characteristic of their special field, both in Hungarian and in at least one foreign language.</li> <li>- Know and apply the terminology and special expressions of their professional field in Hungarian and in at least one foreign language.</li> </ul>			
<b>Bibliography:</b>			
1. Bercsey Tibor: A terméktervezés módszertana			
2. <a href="https://elearning.uni-obuda.hu/">https://elearning.uni-obuda.hu/</a> electronic notes and aids prepared by the instructor			

<b>Name of subject:</b> <b>Integrated product design I.</b>	<b>NEPTUN-code:</b> RTXTT1EBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 1+0+3	<b>Credit: 5</b> <b>Requirements:</b> practice mark
<b>Course coordinator:</b> Prof. Márta Kisfaludy DLA	<b>Title:</b> professor	<b>Prerequisite:</b> Form design I.	
<b>Subject content:</b>			
<p>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 modeling, presentation and evaluation.</p> <p>Establishing the function structure. Creation philosophy. Model families. Aiding design by computers.</p> <p>Systemdesign ranges from the suggestion of simple problems to more complicated projects.</p> <p>The course focuses on the preparation of functional prototypes according to the design tasks.</p> <p>The subject is focused on product development in a team-work, primarily with preparing functional prototypes according to the designs.</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge</p> <ul style="list-style-type: none"> <li>- Knowledge of basic design principles and methods, as well as major production technology procedures and operating processes.</li> <li>- Knowledge of the most important basic materials applied in the special area of product design, their production and their application criteria.</li> <li>- Knowledge of the ethics and methods of team work.</li> </ul> <p>b) capabilities</p> <ul style="list-style-type: none"> <li>- Able to design the form and construction of relatively simple products by taking into account the limits of production technology, the costs expected, and impacts on the environment.</li> <li>- Able to perform the virtual modelling of product concepts and products using 3D computer-aided design systems as well as to produce their technical documentation.</li> <li>- Able to produce, examine and test real models and prototypes using direct digital production technologies based on both traditional and 3D product models.</li> <li>- Able to master new knowledge by solving practical problems empirically.</li> <li>- Able to apply the calculation and modelling principles and methods of special Bibliography: related to industrial product design.</li> <li>- Able to take part in and also to manage team work.</li> <li>- Able to initiate, compile, and carry out projects in team work, primarily in a multidisciplinary environment.</li> </ul>			

- Able to take into account the aspects of the historical, cultural, socio-economic and industrial environment in the process of industrial design and product development.
- Able to analyze design projects by applying design methods and to give methodological reasons for the workflows applied.

c) attitude

- Efforts to make self-education in the special area of industrial product design a continuous process in line with professional objectives.
- Efforts to solve tasks and make management decisions by being aware of the opinions of the colleagues supervised, possibly in cooperation therewith.
- Open to transmitting own knowledge to colleagues.
- Taking care to promote subordinates' professional development, to manage and help such endeavors.
- Taking care of ensuring equal access opportunities in problem solving.

***Bibliography:***

1. Kocsis, J.: Menedzsment műszakiaknak.(2. kiadás) Műszaki könyvkiadó, Budapest, 1996
2. Iványi, A.-Hoffer, I.: Innovációs és értékelemző módszertan, AULA, Budapest, 1996
3. Hegedűs, J.: Súlyponteltolódások a termékvilágban – új diszciplínák megjelenése a termékvilágban.
4. <https://elearning.uni-obuda.hu/> electronic notes and aids prepared by the instructor

<b>Name of subject:</b> <b>Environmental protection (blended)</b>	<b>NEPTUN-code:</b> RTXSK2EBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 1+2+0	<b>Credit:</b> 4 <b>Requirements:</b> practice mark
<b>Course coordinator:</b> Gabriella Oroszlány PhD	<b>Title:</b> assistant lecturer	<b>Prerequisite:</b> -	
<b>Subject content:</b>			
<p>Description of the safety, health-protection, environmental protection, quality assurance and control system of requirements of the relevant professional fields (textile, clothes, leather, paper, plastic, etc.). Environmental effects of the technologies, environmental protection problems, arising in the course of industrial manufacture, their analysis and up-to-date management. The general rules and regulations of waste management. Minimizing of the wastes, possibilities of their recycling and re-use, guiding principles for waste disposal. Resource management.</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge</p> <ul style="list-style-type: none"> <li>- Knowledge of expectations and requirements prevailing in the areas of health and safety, fire protection and safety engineering as related to the relevant special field, as well as applicable environmental regulations.</li> <li>- Knowledge of the basics, limitations and requirements of the special fields of marketing, management, environment protection, quality assurance, information technology, law, and economics, intrinsically linked to the special area of product design.</li> </ul> <p>b) capabilities</p> <ul style="list-style-type: none"> <li>- Understand and use characteristic online and printed references characteristic of their special field, both in Hungarian and in at least one foreign language.</li> <li>- Know and apply the terminology and special expressions of their professional field in Hungarian and in at least one foreign language.</li> </ul> <p>c) attitude</p> <ul style="list-style-type: none"> <li>- Complying and ensuring compliance with the applicable requirement systems of security, health and safety, environment protection, quality assurance and inspection during work.</li> </ul>			
<b>Bibliography:</b>			
1. Zalavári József: A forma tervezése. Designökológia. Scolar Kiadó, 2008.			
2. <a href="https://elearning.uni-obuda.hu/">https://elearning.uni-obuda.hu/</a> electronic notes and aids prepared by the instructor			
3. TMTE szakmai kiadványai			

<b>Name of subject:</b> Ergonomics	<b>NEPTUN-code:</b> RTXER1BBNE	<b>Number of hours:</b> lec+gs+lab 1+1+0	<b>Credit: 3</b> <b>Requirements:</b> practice mark
<b>Course coordinator:</b> Gabriella Oroszlány PhD	<b>Title:</b> assistant lecturer	<b>Előkövetelmény:</b> Form design I.	
<b>Subject content:</b>			
<p>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, memory. Product ergonomics. The user base. Designer approaches. The ergonomic quality of the product. Ergonomic criteria. Biomechanical bases , human power and applying torque . 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. Ergonomic design of work environment.</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge - Knowledge of basic design principles and methods, as well as major production technology procedures and operating processes. - Knowledge of the fundamental methods, rules and standards of ergonomics and psychology as required for industrial product design.</p> <p>b) capabilities - Able to design the form and construction of relatively simple products by taking into account the limits of production technology, the costs expected, and impacts on the environment.</p> <p>c) attitude - Taking care of ensuring equal access opportunities in problem solving.</p>			
<b>Bibliography:</b>			
1. Hercegfői K., Izsó L. (szerk.): Ergonómia. Typotex Kiadó, Budapest, 2007.			
2. Becker Gy.-Kaucsek Gy: Termékergonómia és pszichológia, Tölgyfa Kiadó, Bp.1996			
3. <a href="https://elearning.uni-obuda.hu/">https://elearning.uni-obuda.hu/</a> electronic notes and aids prepared by the instructor			

<b>Name of subject:</b> <b>Marketing and trade</b>	<b>NEPTUN-code:</b> RTXMK2EBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 1+2+0	<b>Credit: 3</b> <b>Requirements:</b> practice mark
<b>Course coordinator:</b> Orsolya Nagy Szabó PhD	<b>Title:</b> assistant lecturer	<b>Prerequisite:</b> -	
<b>Subject content:</b>			
<p>The role, functions and structure of the trade. The operators of distribution channels, retailers grouping. Contents of the foreign trade contract. Cultures characteristics of international trade. The basic principles of business ethics. Sustainable development, the concept of fair trade. Sales promotion methods. Online Sales: webshop. The online marketing (Adwords, FB Twitter, etc). Personal selling. Personality Types. Consumer behavior. Sales and negotiation techniques. Intellectual property. Invention patents, trademarks, know-how, industrial design, licensing, franchising concept. Objectives of advertising, pricing strategy. The basics of advertising psychology. The mechanism of action of advertising. Advertising messages in practice: historical and contemporary advertising. Exhibitions and professional fairs.</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge - Knowledge of the basics, limitations and requirements of the special fields of marketing, management, environment protection, quality assurance, information technology, law, and economics, intrinsically linked to the special area of product design.</p> <p>b) capabilities - Understand and use characteristic online and printed references characteristic of their special field, both in Hungarian and in at least one foreign language. - Know and apply the terminology and special expressions of their professional field in Hungarian and in at least one foreign language.</p> <p>c) attitude - Market, environment, and customer oriented.</p>			
<b>Bibliography:</b>			
1. Bauer András: Marketing alapismeretek, Bp., Aula kiadó, 2007			
2. Philip Kotler: Marketing menedzsment, Budapesti Műszaki Könyvkiadó, 1998.			
3. Hoffmann Márta: Piackutatás, Budapesti Műszaki Könyvkiadó, 2000.			
4. Pákh Miklós: Értékesítés, reklám, propaganda, vevőszolgálat, GTE. Bp. 1990			
5. Morrison, T., Wayne.A.,Conaway G.,Borden, A.: Meghajlás vagy kézfogás?/Üzleti etikett a világ ötvenhét országában, Alexandra, 2002.			
6. <a href="https://elearning.uni-obuda.hu/">https://elearning.uni-obuda.hu/</a> electronic notes and aids prepared by the instructor			

<b>Name of subject:</b> <b>Integrated management systems</b>	<b>NEPTUN-code:</b> RMWIM1EBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 2+0+0	<b>Credit: 3</b> <b>Requirements:</b> practice mark
<b>Course coordinator:</b> Eszter Kormány PhD	<b>Title:</b> assistant lecturer	<b>Prerequisite:</b> -	
<b>Subject content:</b>			
<p>The concept of the system. Historical background. Tools used for controlling the systems. The logic and internal structure of corporate management systems.</p> <p>Principles and standards in the regulation of different management systems. (Laws, regulations, standards, internal policies, recording facts.)</p> <p>The concept of quality. (Demand and the process of meeting the demand. Kano philosophy. The documentation system. (Basic logic, structure. Appearance, corporate management systems)</p> <p>Organizational objectives and their breakdown. (The responsibility of the management. Strategic plan and its breakdown. Quality policy. Organizational structure.)</p> <p>Designing in case of product manufacturing and servicing as well as unique and repetitive processes. The process of designing.</p> <p>Product liability and consumer protection.</p> <p>The criteria of process design. Project monitoring and control. The stability of processes and capability. Criteria towards products. (The capability indicators of measured and attributes data, control cards)</p> <p>Problem solving, analytical and development methods supporting engineering practices. (Pareto, Ishikawa, fault tree, weighting, 5S, 8D, kanban, poka-yoke, managing complex problems)</p> <p>Process and product verification and its tools.</p>			
<b>Bibliography:</b>			
<ol style="list-style-type: none"> <li>1. Lindsay, William M.; Petrick, Joseph A.: Total Quality and Organization Development. Total Quality Series. St. Lucie Press, 2000</li> <li>2. Koczor Zoltán: Minőségirányítási rendszerek fejlesztése. TÜV Rheinland Intercert Kft. 2004</li> </ol>			



<b>Name of subject:</b> <b>Projectmanagement</b> <b>(blended)</b>	<b>NEPTUN-code:</b> RMEPR1KBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 1+1+0	<b>Credit: 3</b> <b>Requirement:</b> examination
<b>Course coordinator:</b> Áron Takács PhD	<b>Title:</b> college professor	<b>Prerequisite:</b> -	
<b>Curriculum</b>			
<p>The industrial one-, in service activities, the competition it is possible to solve single tasks by unique planning and an implementation only in a sphere, in which ones it is necessary to manufacture a new product inside a given budgetary framework, completed by a given deadline with the use of a finite or limited resource. To build up an establishment, to develop a service, a product to plan, . . .</p> <p>The one like this and to this similar projects specific – because of the application of the routines different – outlook, actual methods and techniques request his use. The project management reports the formation of a new discipline in this sense.</p> <p>The topics of the subject top knowledge with it, how is needed a strategy formulated projects with the different aim oriented one to realise, how it is necessary to handle emerging insecurities and risks, and organizational and leadership, mechanical-technical, furthermore economic-, how it is possible to find a solution to related problems with the projects with the application of timing knowledge.</p>			
<b>Bibliography:</b>			
1. Dr. Takács Á.: Projektmenedzsment, Digitális jegyzet ÓE-RKK 6075			
2. Dr. Takács Á.: Folyamatszervezés, Digitális jegyzet ÓE-RKK 6029			
3. Project management guide (PMBOK® Guide) 5. Akadémiai Kiadó, Budapest, 2013, ISBN: 978 963 05 9426 4			

<b>Name of subject:</b> <b>Form design I.</b>	<b>NEPTUN-code:</b> RTXFO1BBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 0+0+3	<b>Credit: 3</b> <b>Requirements:</b> practice mark
<b>Course coordinator:</b> Dóra Papp-Vid DLA	<b>Title:</b> assistant lecturer	<b>Prerequisite:</b> Freehand drawing I.	
<b>Subject content:</b>			
<p>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.</p> <p>Knowledge of the qualities of different types of trade-specific materials and experimentation with their shape forming possibilities.</p> <p>Innovative experiments of creating spatial forms.</p> <p>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.</p> <p>Functionality and visualisation.</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge</p> <ul style="list-style-type: none"> <li>- Knowledge of basic design principles and methods, as well as major production technology procedures and operating processes.</li> <li>- Knowledge of the most important basic materials applied in the special area of product design, their production and their application criteria.</li> <li>- Knowledge of basic construction designs and their dimensioning basics.</li> <li>- Knowledge of the fundamental rules and technological limitations of shaping products, of striking a harmony between content and form.</li> </ul> <p>b) capabilities</p> <ul style="list-style-type: none"> <li>- Able to design the form and construction of relatively simple products by taking into account the limits of production technology, the costs expected, and impacts on the environment.</li> <li>- Able to transplant solutions evolved in nature into technical practice.</li> </ul> <p>c) attitude</p> <ul style="list-style-type: none"> <li>- Efforts to make self-education in the special area of industrial product design a continuous process in line with professional objectives.</li> </ul>			
<b>Bibliography:</b>			
1. Slézia József: Design évkönyv 1/2/3. Bp. Designtrend Kft., 2008, 2009, 2010			
2. Zalavári József: A forma tervezése, designökológia. Bp. Scolar kiadó, 2008.			
3. Bhaskaran, Lakshmi: A forma művészete. BP. Scolar kiadó, 2007			
4. Fiell, Charlotte and Peter: Design kézikönyv. Taschen/Vince kiadók, 2007.			
5. <a href="https://elearning.uni-obuda.hu/">https://elearning.uni-obuda.hu/</a> electronic notes and aids prepared by the instructor			

<b>Name of subject:</b> <b>Form design II.</b>	<b>NEPTUN-code:</b> RTXFO2BBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 0+0+3	<b>Credit:</b> 4 <b>Requirements:</b> practice mark
<b>Course coordinator:</b> Dóra Papp-Vid DLA	<b>Title:</b> assistant lecturer	<b>Prerequisite:</b> Form design I.	
<b>Subject content:</b>			
<p>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.</p> <p>Knowledge of the qualities of different types of trade-specific materials and experimentation with their shape forming possibilities °</p> <p>Discovering and analyzing technical, structural, functional and aesthetic solutions through innovative experiments in spatial forms. Bionic as a source of inspiration. The role of information exploration in the design process. Validating design principles in the design process. Product design: basic form studies, decisive form characteristics, aesthetic and technical interpretation and design of dimensions. Function analysis.</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge</p> <ul style="list-style-type: none"> <li>- Knowledge of basic design principles and methods, as well as major production technology procedures and operating processes.</li> <li>- Knowledge of the most important basic materials applied in the special area of product design, their production and their application criteria.</li> <li>- Knowledge of basic construction designs and their dimensioning basics.</li> <li>- Knowledge of the fundamental rules and technological limitations of shaping products, of striking a harmony between content and form.</li> </ul> <p>b) capabilities</p> <ul style="list-style-type: none"> <li>- Able to design the form and construction of relatively simple products by taking into account the limits of production technology, the costs expected, and impacts on the environment.</li> <li>- Able to transplant solutions evolved in nature into technical practice.</li> </ul> <p>c) attitude</p> <ul style="list-style-type: none"> <li>- Efforts to make self-education in the special area of industrial product design a continuous process in line with professional objectives.</li> </ul>			
<b>Bibliography:</b>			
1. Slézia József: Design évkönyv 1/2/3. Bp. Designtrend Kft., 2008, 2009, 2010			
2. Zalavári József: A forma tervezése, designökológia. Bp. Scolar kiadó, 2008.			
3. Bhaskaran, Lakshmi: A forma művészete. BP. Scolar kiadó, 2007			
4. Fiell, Charlotte and Peter: Design kézikönyv. Taschen/Vince kiadók, 2007.			
5. <a href="https://elearning.uni-obuda.hu/">https://elearning.uni-obuda.hu/</a> electronic notes and aids prepared by the instructor			

<b>Name of subject:</b> <b>Freehand drawing I.</b>	<b>NEPTUN-code:</b> RTXSR1BBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 0+0+3	<b>Credit: 3</b> <b>Requirements:</b> practice mark
<b>Tantárgyfelelős:</b> Edit Csanák DLA	<b>Title:</b> associate professor	<b>Prerequisite:</b> -	
<b>Subject content:</b>			
<p>Freehand modes of representation with traditional manual techniques. Analysis and representation of the structural relationships between geometric objects. Relationship between the subject and the background/space.</p> <p>Understanding the principles of artistic representation. Conditions of composition design. Geometric perspective view of the body. Light - shadow, linear and tonal drawings. Drapery - and object representation with various techniques. Color compositions and color harmonies of still life.</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge</p> <ul style="list-style-type: none"> <li>- Knowledge of the fundamental rules and technological limitations of shaping products, of striking a harmony between content and form.</li> <li>- Knowledge of major analogies between natural and technical systems, and their possible applications in design.</li> </ul> <p>b) capabilities</p> <ul style="list-style-type: none"> <li>- Able to present graphical product concepts and sketches using traditional manual techniques.</li> </ul>			
<b>Bibliography:</b>			
1. Bagnall, Brian: Rajzolás és festés nagykönyve, Hajja & Fiai Könyvkiadó, Debrecen			
2. Cser Andor: Művészeti ismeretek I., KMF, Bp. 1997.			
3. <a href="https://elearning.uni-obuda.hu/">https://elearning.uni-obuda.hu/</a> electronic notes and aids prepared by the instructor			

<b>Name of subject:</b> <b>Freehand drawing II.</b>	<b>NEPTUN-code:</b> RTXSR2BBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 0+0+3	<b>Credit: 3</b> <b>Requirements:</b> practice mark
<b>Tantárgyfelelős:</b> Edit Csanák DLA	<b>Title:</b> associate professor	<b>Prerequisite:</b> Freehand drawing I.	
<b>Subject content:</b>			
Freehand modes of representation with traditional manual techniques. Artistic anatomy of the human body proportions. The study of the structure of bones and musculoskeletal system. Stylized figural group-compositions through creative practices. Spatial representations. Building and interior elements. Color compositions based on natural inspiration.			
<b>Competences to be mastered:</b>			
a) knowledge - Knowledge of the fundamental rules and technological limitations of shaping products, of striking a harmony between content and form. - Knowledge of major analogies between natural and technical systems, and their possible applications in design.			
b) capabilities - Able to present graphical product concepts and sketches using traditional manual techniques.			
<b>Bibliography:</b>			
1. Barcsay Jenő: Művészeti anatómia, Corvina Kiadó, Budapest, 2004.			
2. Barcsay Jenő: Ember és drapéria, Pest M. Múz. Ig. Szentendre, 1988.			
3. John Raynes: Alakrajz - Emberábrázolás kézikönyv, Replica Kiadó Kft., Budapest, 2007			
4. Bagnall, Brian: Rajzolás és festés nagykönyve, Hajja & Fiai Könyvkiadó, Debrecen			
5. <a href="https://elearning.uni-obuda.hu/">https://elearning.uni-obuda.hu/</a> electronic notes and aids prepared by the instructor			

<b>Name of subject:</b> <b>Visual communication</b>	<b>NEPTUN-code:</b> RTXVK1EBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 0+0+2	<b>Credit: 4</b> <b>Requirements:</b> practice mark
<b>Course coordinator:</b> Daniella Koós PhD	<b>Title:</b> assistant lecturer	<b>Prerequisite:</b> Form design I.	
<b>Subject content:</b>			
<p>Communication through images. The forms of the visual conveyance of meaning. Creativity and visual thinking.</p> <p>Based on freehand drawing, practicing the different graphical methods, genres, techniques, introducing the possibilities of graphic design.</p> <p>The psychological context of vision. Basic concepts of aesthetics.</p> <p>The development of individual visual expressions. Style exercises.</p> <p>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.</p> <p>Designing corporate identity through group projects. Documentation.</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge</p> <ul style="list-style-type: none"> <li>- Knowledge of the fundamental rules and technological limitations of shaping products, of striking a harmony between content and form.</li> <li>- Knowledge of major analogies between natural and technical systems, and their possible applications in design.</li> </ul> <p>b) capabilities</p> <ul style="list-style-type: none"> <li>- Able to present graphical product concepts and sketches using traditional manual techniques.</li> </ul>			
<b>Bibliography:</b>			
1. Rudolf Arnheim: A vizuális élmény Az alkotó látás pszichológiája Aldus, Budapest, 2004 ISBN: 9632172833			
2. Tőrekő Ferenc: Vizuális kommunikáció Nemzeti Tankönyvkiadó, Budapest, 2002 ISBN: 9789631925005			
3. Kepes György: A látás nyelve. Gondola (1979)			
4. <a href="https://elearning.uni-obuda.hu/">https://elearning.uni-obuda.hu/</a> electronic notes and aids prepared by the instructor			

<b>Name of subject:</b> <b>Modelling</b>	<b>NEPTUN-code:</b> RTXMO1BBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 0 + 0 + 2	<b>Credit:3</b> <b>Requirements:</b> practice mark
<b>Course coordinator:</b> Dóra Papp-Vid DLA	<b>Title:</b> assistant lecturer	<b>Előkövetelmény:</b> Freehand drawing I.	
<b>Subject content:</b>			
<p>A modeling study helps to learn the analogies between natural and technical systems and their application possibilities in design.</p> <p>Systematics of geometric and organic shapes. Analysis of the laws of geometric and natural forms. The concept of modeling and field of use. Modeling materials. Development of design vision to help the shape creating process with the representation of basic shapes of geometric models and study their characteristics and properties. Production of models from geometric shapes. Analysis of organic forms by making paper drawings. Scale modeling of natural forms.</p> <p>Practicing the most important methods of the professional field to solve future design tasks.</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge</p> <ul style="list-style-type: none"> <li>- Knowledge of basic design principles and methods, as well as major production technology procedures and operating processes</li> <li>- Knowledge of the most important basic materials applied in the special area of product design, their production and their application criteria.</li> <li>- Knowledge of major analogies between natural and technical systems, and their possible applications in design.</li> </ul> <p>b) capabilities</p> <ul style="list-style-type: none"> <li>- Able to transplant solutions evolved in nature into technical practice.</li> </ul>			
<b>Bibliography:</b>			
1. Lissák György: A formáról, Láng Kiadó, 1998.			
2. <a href="https://elearning.uni-obuda.hu/">https://elearning.uni-obuda.hu/</a> electronic notes and aids prepared by the instructor			

**Product design specialization (Interior-textile, fashion-accessories)**

<p><b>Name of subject:</b>  <b>Integrated product design II. (interior and fashion)</b></p>	<p><b>NEPTUN-code:</b>  RTXTT1EBNE</p>	<p><b>Number of hours:</b>  <i>lec+gs+lab</i>  0+0+4</p>	<p><b>Credit: 5</b>  <b>Requirements:</b>  practice mark</p>
<p><b>Course coordinator:</b>  Prof. Márta Kisfaludy DLA</p>	<p><b>Title:</b>  professor</p>	<p><b>Prerequisite:</b>  Integrated product design I.</p>	
<p><b>Subject content:</b></p>			
<p>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 modeling, presentation and evaluation.</p> <p>Colour and form, colour and ergonomics, colour harmonies, colour dynamics design. The cooperation of designers and manufacturers. The cost factors of designing.</p> <p>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, model families. Supporting design with applied computer technology.</p> <p>System design ranges from the suggestion of simple problems to more complicated projects.</p> <p>The course focuses on product development in team work primarily by helping the preparation of functional prototypes according to the plans.</p> <p>Redesign of a common place taking into account the specific characteristics of particular community areas. Coordination of materials, technology and style.</p> <p>Designing uniforms and accessories, taking into account the specifics of a particular corporate image.</p>			
<p><b>Competences to be mastered:</b></p>			
<p>a) knowledge</p> <ul style="list-style-type: none"> <li>- Knowledge of basic design principles and methods, as well as major production technology procedures and operating processes.</li> <li>- Knowledge of the most important basic materials applied in the special area of product design, their production and their application criteria.</li> <li>- Knowledge of the fundamental rules and technological limitations of shaping products, of striking a harmony between content and form.</li> <li>- Knowledge of the most important practical work techniques of their special field.</li> <li>- Knowledge of the ethics and methods of team work.</li> </ul> <p>b) capabilities</p> <ul style="list-style-type: none"> <li>- Able to design the form and construction of relatively simple products by taking into account the limits of production technology, the costs expected, and impacts on the environment.</li> </ul>			



- Able to perform the virtual modelling of product concepts and products using 3D computer-aided design systems as well as to produce their technical documentation.
- Able to produce, examine and test real models and prototypes using direct digital production technologies based on both traditional and 3D product models.
- Able to master new knowledge by solving practical problems empirically.
- Able to apply the calculation and modelling principles and methods of special Bibliography: related to industrial product design.
- Able to take part in and also to manage team work.
- Able to initiate, compile, and carry out projects in team work, primarily in a multidisciplinary environment.
- Able to take into account the aspects of the historical, cultural, socio-economic and industrial environment in the process of industrial design and product development.
- Able to analyze design projects by applying design methods and to give methodological reasons for the workflows applied.

c) attitude

- Efforts to make self-education in the special area of industrial product design a continuous process in line with professional objectives.
- Efforts to solve tasks and make management decisions by being aware of the opinions of the colleagues supervised, possibly in cooperation therewith.
- Open to transmitting own knowledge to colleagues.
- Taking care to promote subordinates' professional development, to manage and help such endeavors.
- Taking care of ensuring equal access opportunities in problem solving.

***Bibliography:***

1. Lissák György: A gondolattól a formáig. Napocska Kiadó 2009
2. Zalavári József: A forma tervezése. Design ökológia. Scolar Kiadó 2008
3. Ernyei Gyula: Design. Tervezéselmélet és termékformálás. Dialóg Campus Kiadó Bp.- Pécs 2000
4. Scherer József: 100 év formatan. Göncöl Kiadó 2000
5. Hegedűs, J.: Súlyponteltolódások a termékvilágban – új diszciplínák megjelenése a termékvilágban.
6. Iványi, A.-Hoffer, I.: Innovációs és értékelemző módszertan, AULA, Budapest, 1996
7. Kocsis, J.: Menedzsment műszakiaknak. (2. kiadás) Műszaki könyvkiadó, Bp. 1996
8. <https://elearning.uni-obuda.hu/> electronic notes and aids prepared by the instructor

<b>Name of subject:</b> <b>Integrated product design III. (interior and fashion)</b>	<b>NEPTUN-code:</b> RTETT1EBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 0+0+4	<b>Credit: 5</b> <b>Requirements:</b> practice mark
<b>Course coordinator:</b> Prof. Márta Kisfaludy DLA	<b>Title:</b> professor	<b>Prerequisite:</b> Integrated product design II. (interior and fashion)	
<b>Subject content:</b>			
<p>Ecological approach in product design. Recycling-reuse-redesign.</p> <p>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, safety and feasibility aspects.</p> <p>The experiments of colour and design studies aim at the diverse presentation of product variants through a design project.</p> <p>The implementation of product design and development projects is aided by the preparation of prototypes and technological model experiments.</p> <p>The most optimal creation of aesthetic product appearance is assisted by the product construction knowledge and the current state of the art industrial background.</p> <p>Solutions for profession-specific project tasks. Re-use / redesign for interior design, clothing and accessories. Design, use of materials, technology and style coordination.</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge</p> <ul style="list-style-type: none"> <li>- Knowledge of basic design principles and methods, as well as major production technology procedures and operating processes.</li> <li>- Knowledge of the most important basic materials applied in the special area of product design, their production and their application criteria.</li> <li>- Knowledge of the fundamental rules and technological limitations of shaping products, of striking a harmony between content and form.</li> <li>- Knowledge of the most important practical work techniques of their special field.</li> <li>- Knowledge of the ethics and methods of team work.</li> </ul> <p>b) capabilities</p> <ul style="list-style-type: none"> <li>- Able to design the form and construction of relatively simple products by taking into account the limits of production technology, the costs expected, and impacts on the environment.</li> <li>- Able to perform the virtual modelling of product concepts and products using 3D computer-aided design systems as well as to produce their technical documentation.</li> <li>- Able to produce, examine and test real models and prototypes using direct digital production technologies based on both traditional and 3D product models.</li> <li>- Able to master new knowledge by solving practical problems empirically.</li> <li>- Able to apply the calculation and modelling principles and methods of special literature related to industrial product design.</li> <li>- Able to take part in and also to manage team work.</li> <li>- Able to initiate, compile, and carry out projects in team work, primarily in a multidisciplinary environment.</li> <li>- Able to take into account the aspects of the historical, cultural, socio-economic and industrial environment in the process of industrial design and product development.</li> </ul>			

- Able to analyze design projects by applying design methods and to give methodological reasons for the workflows applied.

c) attitude

- Efforts to make self-education in the special area of industrial product design a continuous process in line with professional objectives.

- Efforts to solve tasks and make management decisions by being aware of the opinions of the colleagues supervised, possibly in cooperation therewith.

- Open to transmitting own knowledge to colleagues.

- Taking care to promote subordinates' professional development, to manage and help such endeavors.

- Taking care of ensuring equal access opportunities in problem solving.

***Bibliography:***

1. Lissák György: A gondolattól a formáig. Napocska Kiadó 2009

2. Zalavári József: A forma tervezése. Design ökológia. Scolar Kiadó 2008

3. Slézia József: Design évkönyv (2008, 2009, 2010)

4. Erneyi Gyula: Design. Tervezéselmélet és termékformálás. Dialóg Campus Kiadó Bp.- Pécs 2000

5. Scherer József: 100 év formatan. Göncöl Kiadó 2000

6. Hegedűs, J.: Súlyponteltolódások a termékvilágban – új diszciplínák megjelenése a termékvilágban.

7. Iványi, A.-Hoffer, I.: Innovációs és értékelemző módszertan, AULA, Budapest, 1996

8. Kocsis, J.: Menedzsment műszakiaknak. (2. kiadás) Műszaki könyvkiadó, Bp. 1996

9. <https://elearning.uni-obuda.hu/> electronic notes and aids prepared by the instr

<b>Name of subject:</b> <b>Interior and fashion design I.</b>	<b>NEPTUN-code:</b> RTXEO1EBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 2+0+2	<b>Credit:</b> 4 <b>Requirements:</b> practice mark
<b>Course coordinator:</b> Éva Hottó PhD	<b>Title:</b> assistant lecturer	<b>Prerequisite:</b> Form design II.	
<b>Subject content:</b>			
<p>Interior and furniture history. Eras, styles, manufacturing technologies. Today's typical interior style.</p> <p>The architectural elements of design documentation, construction, sizing.</p> <p>Architectural engineering and lighting elements markings, signal systems. Show the fixtures computer engineering floor plan and space.</p> <p>Construction design documentation. Style variations of a given living space in and full design documentation of one style.</p> <p>Aspects of designing clothes, elements, combinations. The proportions of the garment.</p> <p>Basic silhouettes.</p> <p>Design according to article categories, creative shape experiments, drapery studies, basic wardrobe.</p> <p>Article group design, types and typical design solutions. Drapery studies, creative form experiments, basic dress design. Systematization of leather goods. Types, functions and typical design solutions for leather goods. Development and presentation of tenders collections.</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge</p> <ul style="list-style-type: none"> <li>- Knowledge of basic construction designs and their dimensioning basics.</li> </ul> <p>b) capabilities</p> <ul style="list-style-type: none"> <li>- Able to design the form and construction of relatively simple products by taking into account the limits of production technology, the costs expected, and impacts on the environment.</li> <li>- Able to perform the virtual modelling of product concepts and products using 3D computer-aided design systems as well as to produce their technical documentation.</li> <li>- Able to give reasons for the decisions related to the product designed, as well as to test them and support them by technical and standard investigation methods.</li> </ul>			
<b>Bibliography:</b>			
1. Dr. Hottó Éva, Dr. habil Kisfaludy Márta, Szűcs Ágnes: Bevezetés az öltözképzésbe I. OE RKK 6042, elektronikus jegyzet, 2013.			
2. Dr. Hottó Éva, Dr. habil Kisfaludy Márta, Szűcs Ágnes: Bevezetés az öltözképzésbe II. OE RKK 6052, elektronikus jegyzet, 2014.			
3. Korona Péterné: Bőrtermékek és az öltözködés bőr kiegészítői ÓE-RKK 6064. Budapest, 2015.			
4. <a href="https://elearning.uni-obuda.hu/">https://elearning.uni-obuda.hu/</a> electronic notes and aids prepared by the instructor			
1. Korona Péterné, Szűcs Ágnes: A bútortörténet és a design nagy korszakai. ÓE-RKK 6063 Budapest, 2015.			

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| 2. Miller, Judith: Képes bútor enciklopédia, Geopen Kiadó, Bp. 2006.             |
| 3. Kószó József: Családi ház 2. Szukits Könyvkiadó,2000.                         |
| 4. Hervé-Loránt Ervin Kádár László: Lakhatás.Budapest Indivi'Design Stúdió,2001. |

<b>Name of subject:</b> <b>Interior and fashion design II.</b>	<b>NEPTUN-code:</b> RTXEO2EBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 2+0+2	<b>Credit:</b> 4 <b>Requirements:</b> examination
<b>Course coordinator:</b> Éva Hottó PhD	<b>Title:</b> assistant lecturer	<b>Prerequisite:</b> Interior and fashion design I.	
<b>Subject content:</b>			
<p>Simple and special fabric structures and their production. Pattern types, pattern and style. Color pattern design for striped and checkered fabrics Textile printing and printing processes, production criteria of the samples. Possibilities for designing patterns, concept and techniques of report. Special color schemes (transfer printing, inkjet printing, etc.). Colorits, patterns, sample families on different surfaces, materials (tiles, concrete, paper, textiles, etc.). Effect of style and pattern in the interior. Computer aided pattern design. Types of commercial garment trend collections, characteristics of their making. Types, typical shapes and solutions of clothing and accessories made of leather and leather type materials. Leather decoration techniques. Typical shoe types. The language of profession and its special terms in Hungarian and foreign languages.</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge - Knowledge of basic construction designs and their dimensioning basics. b) capabilities - Able to design the form and construction of relatively simple products by taking into account the limits of production technology, the costs expected, and impacts on the environment. - Able to perform the virtual modelling of product concepts and products using 3D computer-aided design systems as well as to produce their technical documentation. - Able to give reasons for the decisions related to the product designed, as well as to test them and support them by technical and standard investigation methods.</p>			
<b>Bibliography:</b>			
1. Dr. Hottó Éva, Dr. habil Kisfaludy Márta, Szűcs Ágnes: Bevezetés az öltözéktervezésbe I. OE RKK 6042, elektronikus jegyzet, 2013.			
2. Dr. Hottó Éva, Dr. habil Kisfaludy Márta, Szűcs Ágnes: Bevezetés az öltözéktervezésbe II. OE RKK 6052, elektronikus jegyzet, 2014.			
3. Korona Péterné: Bőrtermékek és az öltözködés bőr kiegészítői ÓE-RKK 6064. Budapest, 2015.			
4. Dr. Beke J. - Farkas M. - Horváth A. – Kovács A. – Matlák Z.: Könnyűipari enciklopédia /1-2 Bőr- és bőrfeldolgozóipar; BMF-RKK-6000/II. Budapest, 2002			
5. Medveczkyné P.B., Dr. Szűcs I, Szabó R.,Pataki M. Dr. Kokasné P.L, Sinkáné K.A.:Könnyűipari enciklopédia I/3. - Textilipari technológiák - Budapest, BMF-RKK-6000/III. 2002;			
1. Landgráf Katalin, Penkala Éva, Szittner Andrea: Nagy szövéskönyv 1.-2. Mezőgazda Kiadó Kft.2001 -2004,			

2. Medveczkyné P.B., Dr. Szűcs I, Szabó R.,Pataki M. Dr. Kokasné P.L, Sinkáné K.A.:  
Könnnyűipari enciklopédia I/3. - Textilipari technológiák - Budapest, BMF-RKK-6000/III.  
2002.

6. <https://elearning.uni-obuda.hu/> electronic notes and aids prepared by the instructor

<b>Name of subject:</b> <b>Technology of specialization I.</b>	<b>NEPTUN-code:</b> RTWST11BNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 0+0+2	<b>Credit: 2</b> <b>Requirements:</b> practice mark
<b>Course coordinator:</b> Orsolya Nagy Szabó PhD	<b>Title:</b> assistant lecturer	<b>Prerequisite:</b> Machines of industrial technologies I.	
<b>Subject content:</b>			
<p>The purpose of the subject is the knowledge of the basic concepts of sewing technology used in the clothing industry (sewing, seam, stitch, types of stitches, types of seams, types of sewing). Requirements to be met by the sewing. Basic influencing factors of the sewing. General characteristics of the sewing threads and sewing machine needles. Acquisition of the skill of threading, setting and operating industrial sewing machines. Learning essential modes of technical presentation. Learning techniques, types of sewing, their practical application and implementation when making various textile –and leather products.</p> <p>Knowing the requirements of health protection, occupational safety and environmental protection in the practical exercises.</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge</p> <ul style="list-style-type: none"> <li>- Knowledge of basic design principles and methods, as well as major production technology procedures and operating processes.</li> <li>- Knowledge of the most important basic materials applied in the special area of product design, their production and their application criteria.</li> <li>- Knowledge of expectations and requirements prevailing in the areas of health and safety, fire protection and safety engineering as related to the relevant special field, as well as applicable environmental regulations.</li> <li>- Knowledge of the most important practical work techniques of their special field.</li> </ul> <p>b) capabilities</p> <ul style="list-style-type: none"> <li>- Able to explore the causes of failures and to select elimination operations.</li> <li>- Able to resolve relatively simple health and safety tasks.</li> </ul> <p>c) attitude</p> <ul style="list-style-type: none"> <li>- Efforts to solve tasks and make management decisions by being aware of the opinions of the colleagues supervised, possibly in cooperation therewith.</li> </ul>			
<b>Bibliography:</b>			
1. Pap Józsefné dr.: Gyártástechnológia II. BMF RKK 6018 Bp. 2007			
2. Estu Klára: Ruhaiipari technológiák, ÓE-RKK 6048, Budapest, 2013			
3. Korona Péterné: Bőrtermékek és az öltözködés bőr kiegészítői, ÓE-RKK 6064, Budapest, 2015			
4. <a href="https://elearning.uni-obuda.hu/">https://elearning.uni-obuda.hu/</a> electronic notes and aids prepared by the instructor			



<b>Name of subject:</b> <b>Technology of specialization II.</b>	<b>NEPTUN-code:</b> RTWST2IBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 1+0+3	<b>Credit:</b> 4 <b>Requirements:</b> examination
<b>Course coordinator:</b> Orsolya Nagy Szabó PhD	<b>Title:</b> assistant lecturer	<b>Prerequisite:</b> Technology of specialization I.	
<b>Subject content:</b>			
<p>The purpose of the course is to introduce the technologies of making home furnishings and clothing fabrics. Material manipulations, structures, textures. Technical preparation of production, calculation of the proportion of materials, laying rules, preparation of basic and consumable materials, technology of cutting. Sewing injuries.</p> <p>Variations of technology decorations, special closing solutions, fabric edge processing. Spatial textile shapes. Sewing technology features in the production of different products. Leather manufacturing technology.</p> <p>Basics of technology for upholstery of leather and skin type materials and upholstery fabrics.</p> <p>During the exercises, carrying out a project assignment based on an inspiration and professional solutions to the technological details.</p> <p>General criteria, conditions and requirements for making a garment product or accessory.</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge</p> <ul style="list-style-type: none"> <li>- Knowledge of basic design principles and methods, as well as major production technology procedures and operating processes.</li> <li>- Knowledge of the most important basic materials applied in the special area of product design, their production and their application criteria.</li> <li>- Knowledge of expectations and requirements prevailing in the areas of health and safety, fire protection and safety engineering as related to the relevant special field, as well as applicable environmental regulations.</li> <li>- Knowledge of the most important practical work techniques of their special field.</li> </ul> <p>b) capabilities</p> <ul style="list-style-type: none"> <li>- Able to explore the causes of failures and to select elimination operations.</li> <li>- Able to resolve relatively simple health and safety tasks.</li> </ul> <p>c) attitude</p> <ul style="list-style-type: none"> <li>- Efforts to solve tasks and make management decisions by being aware of the opinions of the colleagues supervised, possibly in cooperation therewith.</li> </ul>			
<b>Bibliography:</b>			
1. Pap Józsefné dr.: Gyártástechnológia II. BMF RKK 6018 Bp. 2007			
2. Estu Klára: Ruhaiipari technológiák, ÓE-RKK 6048, Budapest, 2013			
3. Korona Péterné: Bőrtermékek és az öltözködés bőr kiegészítői, ÓE-RKK 6064, Budapest, 2015			
4. <a href="https://elearning.uni-obuda.hu/">https://elearning.uni-obuda.hu/</a> electronic notes and aids prepared by the instructor			

<b>Name of subject:</b> Technology of specialization III.	<b>NEPTUN-code:</b> RTWST3IBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 1+0+3	<b>Credit:</b> 4 <b>Requirements:</b> practice mark
<b>Course coordinator:</b> Orsolya Nagy Szabó PhD	<b>Title:</b> assistant lecturer	<b>Prerequisite:</b> Technology of specialization II.	
<b>Subject content:</b>			
<p>Special technologies for making home furnishing textiles and garment products. Basic concepts of gluing, technological process, factors influencing gluing, areas and methods of gluing.</p> <p>Basic concepts, technological process of wet heat treatment of textiles, factors influencing wet heat treatment.</p> <p>Smart textiles in the interior. Innovative technologies.</p> <p>Manufacturing technology of leatherwork industrial products, self-production of a leatherwork industrial product, and a clothing product.</p> <p>Execution of home furnishing products and clothing models based on the project assignment, taking into account the material properties.</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge</p> <ul style="list-style-type: none"> <li>- Knowledge of basic design principles and methods, as well as major production technology procedures and operating processes.</li> <li>- Knowledge of the most important basic materials applied in the special area of product design, their production and their application criteria.</li> <li>- Knowledge of expectations and requirements prevailing in the areas of health and safety, fire protection and safety engineering as related to the relevant special field, as well as applicable environmental regulations.</li> <li>- Knowledge of the most important practical work techniques of their special field.</li> </ul> <p>b) capabilities</p> <ul style="list-style-type: none"> <li>- Able to explore the causes of failures and to select elimination operations.</li> <li>- Able to resolve relatively simple health and safety tasks.</li> </ul> <p>c) attitude</p> <ul style="list-style-type: none"> <li>- Efforts to solve tasks and make management decisions by being aware of the opinions of the colleagues supervised, possibly in cooperation therewith.</li> </ul>			
<b>Bibliography:</b>			
1. Pap Józsefné dr.: Gyártástechnológia II. BMF RKK 6018 Bp. 2007			
2. Estu Klára: Ruhaiipari technológiák, ÓE-RKK 6048, Budapest, 2013			
3. Korona Péterné: Bőrtermékek és az öltözködés bőr kiegészítői, ÓE-RKK 6064, Budapest, 2015			
4. <a href="https://elearning.uni-obuda.hu/">https://elearning.uni-obuda.hu/</a> electronic notes and aids prepared by the instructor			

<b>Name of subject:</b> <b>Knowledge of textiles and construction</b>	<b>NEPTUN-code:</b> RTXAK1EBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 2+0+2	<b>Credit:</b> 4 <b>Requirements:</b> practice mark
<b>Course coordinator:</b> Judit Borsa PhD	<b>Title:</b> professor	<b>Course coordinator:</b> Technology of specialization I.	
<b>Subject content:</b>			
<p>General characteristics and properties of raw materials used in the textile industry. Types of textiles, traditional and modern materials. The most common types and uses of woven, knitted and nonwoven fabrics Functional and intelligent textiles. Textile testings. Technical data, main characteristics and measurement of linear textiles, fabrics and knitted and crocheted fabrics. Investigation of the behavior of textiles against various stresses during use. Basic knowledge of architecture, properties of materials used in buildings and their applications. Coverings, doors and windows, etc. Basics of building engineering. Dimensions / types / specifications of household and home equipments, lamps, lighting fixtures. Requirements for placement of interior materials (wall and floor tiles, parquet, wallpaper, etc.) and determination of quantity required. Size research, size charts, size standards. The proportions of the human body in terms of clothing design. Body features and their effect on dress designs. Design solutions for various interior and clothing products. Modeling rules. Modeling methods for different component types. Mock-up and innovative experiments for the project task.</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge - Knowledge of basic construction designs and their dimensioning basics. - Knowledge of the most important practical work techniques of their special field. b) capabilities - Able to design the form and construction of relatively simple products by taking into account the limits of production technology, the costs expected, and impacts on the environment. - Able to master new knowledge by solving practical problems empirically. c) attitude - Motivated to familiarize with the latest development trends, solutions and innovations in their special field.</p>			
<b>Bibliography:</b>			
1. Korona Péterné: Bőrtermékek és az öltözködés bőr kiegészítői. OE RKK 6064 elektronikus jegyzet, 2015			
2. Dr. Hottó Éva, Dr. habil Kisfaludy Márta, Szűcs Ágnes: Bevezetés az öltözködéstervezésbe II. OE RKK 6052, elektronikus jegyzet, 2014.			
3. Dán Zoltán - Déri Ágostonné: Gyártmánytervezés I. Bp.KMF 1998.			
4. Benkő Istvánné, Deákfalvi Sarolta: Nőiruha-készítő szakrajz I. Műszaki Könyvkiadó, Bp. 2000.			
5. Ábrahámné, Benkőné, Kun Andrásné: Női szabás-szakrajz I. Göttinger kiadó1998.			
6. Benkő I.-né, Hodován J., Kun Andrásné: Ruhaiipari szabás-szakrajz, MDI-Göttinger Kiadó, 1996.			

1. Fischer, Horst – Uhling, Kurt Jeni: Belsőépítészet. Sziget kiadó, Bp. 2002
2. Weiss, Ulrich: A fürdőszoba beépítése. Magyar Könyvklub, Bp. 2000
3. Medveczkyné P.B., Dr. Szücs I., Szabó R. Pataki M., Dr. Kokasné P.L., Sinkáné Dr. Király A.: Könnyűipari enciklopédia I/3. Textilipari technológiák. BMF-RKK-6000/III. Bp. 2002.
4. Fenyvesi Éva: Újszerű textilipari és műszaki szálanyagok. Magyar Textiltechnika 1994. évi különszáma
6. TMTE szakmai kiadványai
8. Rundschau szaklapok
5. <a href="https://elearning.uni-obuda.hu/">https://elearning.uni-obuda.hu/</a> electronic notes and aids prepared by the instructor

<b>Name of subject:</b> <b>Design visualization</b>	<b>NEPTUN-code:</b> RTWMT1FBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 0+0+2	<b>Credit: 2</b> <b>Requirements:</b> practice mark
<b>Course coordinator:</b> Edit Csanák DLA	<b>Title:</b> associate professor	<b>Előkövetelmény:</b> CAD/CAM I.	
<b>Subject content:</b>			
<p>The purpose of the subject is the acquisition of the technique of design visualization, aided with computer programs, of processing-industrial products. Proportional construction methods of representing the products. Representation of different products in 2 –and 3 dimensional form. Material surfaces, structures and representation of patterns. Plane –and space composition tasks.</p> <p>Computer-aided drawing presentation of product compositions and sketches. Virtual modelling of products and the preparation of their technical documentations. Drawings of products and their environment. Poster design with compositional principles in mind. Creative ways of displaying the interior layout and elements of space. Compilation of complex visual documentation for clothing collections.</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge</p> <ul style="list-style-type: none"> <li>- Knowledge of the fundamental methods, rules and standards of ergonomics and psychology as required for industrial product design.</li> </ul> <p>b) capabilities</p> <ul style="list-style-type: none"> <li>- Able to present graphical product concepts and sketches using traditional manual techniques.</li> <li>- Able to perform the virtual modelling of product concepts and products using 3D computer-aided design systems as well as to produce their technical documentation.</li> <li>- Able to produce, examine and test real models and prototypes using direct digital production technologies based on both traditional and 3D product models.</li> </ul>			
<b>Bibliography:</b>			
1. CAD rendszerek felhasználói kézikönyvei			
2. <a href="https://elearning.uni-obuda.hu/">https://elearning.uni-obuda.hu/</a> electronic notes and aids prepared by the instructor			

<b>Name of subject:</b> <b>Projectwork</b>	<b>NEPTUN-code:</b> RTPPM1IBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 0+0+2	<b>Credit:</b> 4 <b>Requirements:</b> practice mark
<b>Course coordinator:</b> Rita Kendrovics Boda PhD	<b>Title:</b> associate professor	<b>Prerequisite:</b> Technology of specialization III.	
<b>Subject content:</b>			
<p>The purpose of the subject is that the students could use the theoretical knowledge, acquired in the framework of the professional subjects, in practice-oriented projects. The 3-4 strong student groups (occasionally independently as well) learn the workflows – from the raising of the problem through working out the basic ideas, to form experiments – in complex work. The students will get to know the appropriate distribution, time management of the work-phases. They will learn how to make a schedule and to co-ordinate the workflows. After collecting international information and analysing them, the students will design a coordinated exhibition interior in a specific style. They cooperate regularly with their consultants and the competent contact persons of professional organisations and firms. In written form and in presentations, too, the students will report their workflows and results and they will make their portfolios. When carrying out these tasks, in addition to their skill in solving problems, creating forms and in design as well, the adaptability and communication skill of the students will also develop, thus they can get a good background for joining the professional circles.</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge</p> <ul style="list-style-type: none"> <li>- Knowledge of basic design principles and methods, as well as major production technology procedures and operating processes.</li> <li>- Knowledge of the most important basic materials applied in the special area of product design, their production and their application criteria.</li> <li>- Knowledge of basic construction designs and their dimensioning basics.</li> <li>- Knowledge of the learning, knowledge acquisition, and data collection methods of the special field of product design, their ethical limitations and problem solving techniques.</li> <li>- Knowledge of the most important practical work techniques of their special field.</li> <li>- Knowledge of the ethics and methods of team work.</li> </ul> <p>b) capabilities</p> <ul style="list-style-type: none"> <li>- Able to design the form and construction of relatively simple products by taking into account the limits of production technology, the costs expected, and impacts on the environment.</li> <li>- Able to perform the virtual modelling of product concepts and products using 3D computer-aided design systems as well as to produce their technical documentation.</li> <li>- Able to produce, examine and test real models and prototypes using direct digital production technologies based on both traditional and 3D product models.</li> <li>- Able to master new knowledge by solving practical problems empirically.</li> <li>- Understand and use characteristic online and printed references characteristic of their special field, both in Hungarian and in at least one foreign language.</li> </ul>			

- Able to take part in and also to manage team work.
- Able to initiate, compile, and carry out projects in team work, primarily in a multidisciplinary environment.
- Able to take into account the aspects of the historical, cultural, socio-economic and industrial environment in the process of industrial design and product development.
- Able to analyze design projects by applying design methods and to give methodological reasons for the workflows applied.

c) attitude

- Efforts to make self-education in the special area of industrial product design a continuous process in line with professional objectives.
- Efforts to solve tasks and make management decisions by being aware of the opinions of the colleagues supervised, possibly in cooperation therewith.
- Open to transmitting own knowledge to colleagues.
- Taking care to promote subordinates' professional development, to manage and help such endeavors.
- Taking care of ensuring equal access opportunities in problem solving.

***Bibliography:***

1. Zalavári József: A forma tervezése, designökológia. Budapest, Scolar kiadó, 2008
2. <https://elearning.uni-obuda.hu/> electronic notes and aids prepared by the instructor

## Packaging design

<b>Name of subject:</b> <b>Integrated product design II. (packaging)</b>	<b>NEPTUN-code:</b> RTWIT2PBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 0+0+4	<b>Credit: 5</b> <b>Requirements:</b> practice mark
<b>Course coordinator:</b> Prof. Márta Kisfaludy DLA	<b>Title:</b> professor	<b>Prerequisite:</b> Integrated product design I.	
<b>Subject content:</b>			
<p>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 modeling, presentation and evaluation.</p> <p>Colour and form, colour and ergonomics, colour harmonies, colour dynamics design. The cooperation of designers and manufacturers. The cost factors of designing.</p> <p>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, model families. Supporting design with applied computer technology. Goods protection and the design methodology of its tools (package design).</p> <p>System design ranges from the suggestion of simple problems to more complicated projects.</p> <p>The course focuses on product development in team work primarily by helping the preparation of functional prototypes according to the plans.</p> <p>Industry specific design. Packaging design and packaging graphics with taking into account the specific characteristics of the product.</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge</p> <ul style="list-style-type: none"> <li>- Knowledge of basic design principles and methods, as well as major production technology procedures and operating processes.</li> <li>- Knowledge of the most important basic materials applied in the special area of product design, their production and their application criteria.</li> <li>- Knowledge of the fundamental rules and technological limitations of shaping products, of striking a harmony between content and form.</li> <li>- Knowledge of the most important practical work techniques of their special field.</li> <li>- Knowledge of the ethics and methods of team work.</li> </ul> <p>b) capabilities</p> <ul style="list-style-type: none"> <li>- Able to design the form and construction of relatively simple products by taking into account the limits of production technology, the costs expected, and impacts on the environment.</li> <li>- Able to perform the virtual modelling of product concepts and products using 3D computer-aided design systems as well as to produce their technical documentation.</li> <li>- Able to produce, examine and test real models and prototypes using direct digital production technologies based on both traditional and 3D product models.</li> <li>- Able to master new knowledge by solving practical problems empirically.</li> </ul>			



- Able to apply the calculation and modelling principles and methods of special Bibliography: related to industrial product design.
- Able to take part in and also to manage team work.
- Able to initiate, compile, and carry out projects in team work, primarily in a multidisciplinary environment.
- Able to take into account the aspects of the historical, cultural, socio-economic and industrial environment in the process of industrial design and product development.
- Able to analyze design projects by applying design methods and to give methodological reasons for the workflows applied.

c) attitude

- Efforts to make self-education in the special area of industrial product design a continuous process in line with professional objectives.
- Efforts to solve tasks and make management decisions by being aware of the opinions of the colleagues supervised, possibly in cooperation therewith.
- Open to transmitting own knowledge to colleagues.
- Taking care to promote subordinates' professional development, to manage and help such endeavors.
- Taking care of ensuring equal access opportunities in problem solving.

***Bibliography:***

1. Lissák György: A gondolattól a formáig. Napocska Kiadó 2009
2. Zalavári József: A forma tervezése. Design ökológia. Scolar Kiadó 2008
3. Erneyi Gyula: Design. Tervezéselmélet és termékformálás. Dialóg Campus Kiadó Bp.- Pécs 2000
4. Scherer József: 100 év formatan. Göncöl Kiadó 2000
5. Hegedűs, J.: Súlyponteltolódások a termékvilágban – új diszciplínák megjelenése a termékvilágban.
6. Iványi, A.-Hoffer, I.: Innovációs és értékelemző módszertan, AULA, Budapest, 1996
7. Kocsis, J.: Menedzsment műszakiaknak. (2. kiadás) Műszaki könyvkiadó, Bp. 1996
8. <https://elearning.uni-obuda.hu/> electronic notes and aids prepared by the instructor

<b>Name of subject:</b> <b>Integrated product design III. (packaging)</b>	<b>NEPTUN-code:</b> RTXTC2EBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 0+0+4	<b>Credit: 6</b> <b>Requirements:</b> examination
<b>Course coordinator:</b> Prof. Márta Kisfaludy DLA	<b>Title:</b> professor	<b>Prerequisite:</b> Integrated product design II.	
<b>Subject content:</b>			
<p>Ecological approach in product design. Recycling-reuse-redesign.</p> <p>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, safety and feasibility aspects.</p> <p>The experiments of colour and design studies aim at the diverse presentation of product variants through a design project.</p> <p>The implementation of product design and development projects is aided by the preparation of prototypes and technological model experiments.</p> <p>The most optimal creation of aesthetic product appearance is assisted by the product construction knowledge and the current state of the art industrial background.</p> <p>Profession-specific solutions of the project. Packaging of dry goods with eco-conscious approach.</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge</p> <ul style="list-style-type: none"> <li>- Knowledge of basic design principles and methods, as well as major production technology procedures and operating processes.</li> <li>- Knowledge of the most important basic materials applied in the special area of product design, their production and their application criteria.</li> <li>- Knowledge of the fundamental rules and technological limitations of shaping products, of striking a harmony between content and form.</li> <li>- Knowledge of the most important practical work techniques of their special field.</li> <li>- Knowledge of the ethics and methods of team work.</li> </ul> <p>b) capabilities</p> <ul style="list-style-type: none"> <li>- Able to design the form and construction of relatively simple products by taking into account the limits of production technology, the costs expected, and impacts on the environment.</li> <li>- Able to perform the virtual modelling of product concepts and products using 3D computer-aided design systems as well as to produce their technical documentation.</li> <li>- Able to produce, examine and test real models and prototypes using direct digital production technologies based on both traditional and 3D product models.</li> <li>- Able to master new knowledge by solving practical problems empirically.</li> <li>- Able to apply the calculation and modelling principles and methods of special</li> </ul> <p>Bibliography: related to industrial product design.</p> <ul style="list-style-type: none"> <li>- Able to take part in and also to manage team work.</li> <li>- Able to initiate, compile, and carry out projects in team work, primarily in a multidisciplinary environment.</li> </ul>			

- Able to take into account the aspects of the historical, cultural, socio-economic and industrial environment in the process of industrial design and product development.
- Able to analyze design projects by applying design methods and to give methodological reasons for the workflows applied.

c) attitude

- Efforts to make self-education in the special area of industrial product design a continuous process in line with professional objectives.
- Efforts to solve tasks and make management decisions by being aware of the opinions of the colleagues supervised, possibly in cooperation therewith.
- Open to transmitting own knowledge to colleagues.
- Taking care to promote subordinates' professional development, to manage and help such endeavors.
- Taking care of ensuring equal access opportunities in problem solving.

***Bibliography:***

1. Lissák György: A gondolattól a formáig. Napocska Kiadó 2009
2. Zalavári József: A forma tervezése. Design ökológia. Scolar Kiadó 2008
3. Slézia József: Design évkönyv (2008, 2009, 2010)
4. Ernyei Gyula: Design. Tervezéselmélet és termékformálás. Dialóg Campus Kiadó Bp.- Pécs 2000
5. Scherer József: 100 év formatan. Göncöl Kiadó 2000
6. Hegedűs, J.: Súlyponteltolódások a termékvilágban – új diszciplínák megjelenése a termékvilágban.
7. Iványi, A.-Hoffer, I.: Innovációs és értékelemző módszertan, AULA, Budapest, 1996
8. Kocsis, J.: Menedzsment műszakiaknak. (2. kiadás) Műszaki könyvkiadó, Bp. 1996
9. <https://elearning.uni-obuda.hu/> electronic notes and aids prepared by the instructor

<b>Name of subject:</b> Packaging design I.	<b>NEPTUN-code:</b> RMWCT1EBNE	<b>Number of hours:</b> lec+gs+lab 2+0+2	<b>Credit:</b> 4 <b>Requirements:</b> practice mark
<b>Course coordinator:</b> Róbert Németh DLA	<b>Title:</b> associate professor	<b>Prerequisite:</b> Form design II.	
<b>Subject content:</b>			
<p>The types of design tasks. Specific aspects of the consumer and multipack packaging design. Process of technical design of the packaging. Requirements planning. Packaging forms, structures, types and sizing concepts of flexible types of paper, cardboard and corrugated cardboard sheets and their system planning.</p> <p>Cargo unit formation.</p> <p>The role of typography in packaging design.</p> <p>Analysis and redesign of a commercially available product packaging with the use of corporate identity elements.</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge</p> <ul style="list-style-type: none"> <li>- Knowledge of basic construction designs and their dimensioning basics.</li> </ul> <p>b) capabilities</p> <ul style="list-style-type: none"> <li>- Able to design the form and construction of relatively simple products by taking into account the limits of production technology, the costs expected, and impacts on the environment.</li> <li>- Able to perform the virtual modelling of product concepts and products using 3D computer-aided design systems as well as to produce their technical documentation.</li> <li>- Able to give reasons for the decisions related to the product designed, as well as to test them and support them by technical and standard investigation methods.</li> </ul>			
<b>Bibliography:</b>			
1. Dr. Németh R., Tiefbrunner A.: Csomagolástervezés. elektronikus jegyzet ÓE. 2015.			
2. Györgyi A., Tiefbrunner A., Varga J.: Csomagolástervezés. Papír-Press Egyesülés, Bp. 1999.			
3. Tiefbrunner A.: Csomagolás – Trendek és kérdések, CompLex, 2010.			
4. <a href="https://elearning.uni-obuda.hu/">https://elearning.uni-obuda.hu/</a> electronic notes and aids prepared by the instructor			

<b>Name of subject:</b> <b>Packaging design II.</b>	<b>NEPTUN-code:</b> RMWCT2EBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 2+0+2	<b>Credit:</b> 4 <b>Requirements:</b> examination
<b>Course coordinator:</b> Róbert Németh DLA	<b>Title:</b> associate professor	<b>Prerequisite:</b> Packaging design I.	
<b>Subject content:</b>			
<p>Theoretical aspects of the packaging design: information content, advertising effect, possibilities of notation.</p> <p>Acquiring of the basis of corrugated cardboard packaging design and practical application of it with ESKO Artios CAD program.</p> <p>Box constructions (FEFCO).</p> <p>The technical aspects of graphic design.</p> <p>Printing and marking.</p> <p>Shrink-labeling.</p> <p>Documentation of the entire process through a specific design task.</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge</p> <ul style="list-style-type: none"> <li>- Knowledge of basic construction designs and their dimensioning basics.</li> </ul> <p>b) capabilities</p> <ul style="list-style-type: none"> <li>- Able to design the form and construction of relatively simple products by taking into account the limits of production technology, the costs expected, and impacts on the environment.</li> </ul> <p>Able to perform the virtual modelling of product concepts and products using 3D computer-aided design systems as well as to produce their technical documentation.</p> <ul style="list-style-type: none"> <li>- Able to give reasons for the decisions related to the product designed, as well as to test them and support them by technical and standard investigation methods.</li> </ul>			
<b>Bibliography:</b>			
1. Dr. Németh R., Tiefbrunner A.: Csomagolástervezés. elektronikus jegyzet ÓE. 2015.			
2. Györgyi A., Tiefbrunner A., Varga J.: Csomagolástervezés. Papír-Press Egyesülés, Bp. 1999.			
4. <a href="https://elearning.uni-obuda.hu/">https://elearning.uni-obuda.hu/</a> electronic notes and aids prepared by the instructor			

<b>Name of subject:</b> <b>Packaging and Paper Technology I.</b>	<b>NEPTUN-code:</b> RMWPT1EBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 1+0+1	<b>Credit: 2</b> <b>Requirement:</b> practice mark
<b>Course coordinator:</b> László Koltai PhD	<b>Title:</b> associate professor	<b>Prerequisite:</b> -	
<b>Subject content:</b>			
History of paper and paper- and pulp production. Position and future of the paper industry in the Hungarian and world economy. Semi-finished products of paper industry. Pulps and rawmaterials: mechanical, thermo-mechanical semi-finished chemical cellulose pulp and bleaching. Pulp preparation. Fiber pulping, sizing, filling, refining, coloring. Papermachines and the type of its structural arrangement. Cardboard and sheet production. The presentation operations, calenders. Paper after-processing. Areas of paper processing. Corrugated board production.			
<b>Competences to be mastered:</b>			
a) knowledge - Knowledge of basic design principles and methods, as well as major production technology procedures and operating processes. - Knowledge of the most important basic materials applied in the special area of product design, their production and their application criteria. - Knowledge of expectations and requirements prevailing in the areas of health and safety, fire protection and safety engineering as related to the relevant special field, as well as applicable environmental regulations. - Knowledge of the most important practical work techniques of their special field.			
b) capabilities - Able to explore the causes of failures and to select elimination operations. - Able to resolve relatively simple health and safety tasks.			
c) attitude - Efforts to solve tasks and make management decisions by being aware of the opinions of the colleagues supervised, possibly in cooperation therewith.			
<b>Bibliography:</b>			
1. Mark J. K.: Paper and Paperboard Packaging Technology 2005 by Blackwell Publishing Ltd.			
2. Herbert Holik (Editor): Handbook of Paper and Board, ISBN: 978-3-527-33184-0			
3. J. F. Hanlon: Handbook of Package Engineering, Third Edition ISBN-13: 978-1566763066			
4. <a href="https://elearning.uni-obuda.hu/">https://elearning.uni-obuda.hu/</a> electronic notes and aids prepared by the instructor			

<b>Name of subject:</b> <b>Packaging and Paper Technology II.</b>	<b>NEPTUN-code:</b> RMWPT2EBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 1+0+3	<b>Credit:</b> 4 <b>Requirement:</b> examination
<b>Course coordinator:</b> László Koltai PhD	<b>Title:</b> associate professor	<b>Prerequisite:</b> Packaging and Paper Technology I.	
<b>Subject content:</b>			
Fundamentals of packaging technology. The aim of packaging, functions, grouping of requirements. Packing agents. Paper-based, glass and plastic packaging materials. Packaging and logistics. Transport packaging, loading units. Packaging and environmental protection. Hungarian legislation, waste utilization. Consumer packaging as an advertising medium.			
<b>Competences to be mastered:</b>			
a) knowledge			
- Knowledge of basic design principles and methods, as well as major production technology procedures and operating processes.			
- Knowledge of the most important basic materials applied in the special area of product design, their production and their application criteria.			
- Knowledge of expectations and requirements prevailing in the areas of health and safety, fire protection and safety engineering as related to the relevant special field, as well as applicable environmental regulations.			
- Knowledge of the most important practical work techniques of their special field.			
b) capabilities			
- Able to explore the causes of failures and to select elimination operations.			
- Able to resolve relatively simple health and safety tasks.			
c) attitude			
- Efforts to solve tasks and make management decisions by being aware of the opinions of the colleagues supervised, possibly in cooperation therewith.			
<b>Bibliography:</b>			
1. Kerekes T. :Bevezetés a csomagolótechnikába I-II, Papír-Press kiadó, 2000.			
2. Tiefbrunner A.: Csomagolás - Trendek és kérdések, COMPLEX KIADÓ KFT, 2010			
3. Papíripari szaklexikon, Papír-Press kiadó, Budapest, 2002			
4. <a href="https://elearning.uni-obuda.hu/">https://elearning.uni-obuda.hu/</a> electronic notes and aids prepared by the instructor			

<b>Name of subject:</b> <b>Packaging and Paper Technology III.</b>	<b>NEPTUN-code:</b> RMWPT3EBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 1+0+3	<b>Credit:</b> 4 <b>Requirement:</b> practice mark
<b>Course coordinator:</b> László Koltai PhD	<b>Title:</b> associate professor	<b>Prerequisite:</b> Packaging and Paper Technology II.	
<b>Subject content:</b>			
Fundamentals of packaging technology. The aim of packaging, functions, grouping of requirements. Packing agents. Paper-based, glass and plastic packaging materials. Packaging and logistics. Transport packaging, loading units. Packaging and environmental protection. Hungarian legislation, waste utilization. Consumer packaging as an advertising medium.			
<b>Competences to be mastered:</b>			
a) knowledge			
- Knowledge of basic design principles and methods, as well as major production technology procedures and operating processes.			
- Knowledge of the most important basic materials applied in the special area of product design, their production and their application criteria.			
- Knowledge of expectations and requirements prevailing in the areas of health and safety, fire protection and safety engineering as related to the relevant special field, as well as applicable environmental regulations.			
- Knowledge of the most important practical work techniques of their special field.			
b) capabilities			
- Able to explore the causes of failures and to select elimination operations.			
- Able to resolve relatively simple health and safety tasks.			
c) attitude			
- Efforts to solve tasks and make management decisions by being aware of the opinions of the colleagues supervised, possibly in cooperation therewith.			
<b>Bibliography:</b>			
1. Kerekes T. :Bevezetés a csomagolótechnikába I-II, Papír-Press kiadó, 2000.			
2. Tiefbrunner A.: Csomagolás - Trendek és kérdések, COMPLEX KIADÓ KFT, 2010			
3. Papíripari szaklexikon, Papír-Press kiadó, Budapest, 2002			
4. <a href="https://elearning.uni-obuda.hu/">https://elearning.uni-obuda.hu/</a> electronic notes and aids prepared by the instructor			



<b>Name of subject:</b> <b>Material knowledge of paper packaging</b>	<b>NEPTUN-code:</b> RMWPA1EBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 1+0+3	<b>Credit:</b> 4 <b>Requirements:</b> practice mark
<b>Course coordinator:</b> László Koltai PhD	<b>Title:</b> associate professor	<b>Prerequisite:</b> Packaging and paper technology I.	
<b>Subject content:</b>			
<p>Paper types classification, and their main characteristics. Measurement theory, the reproducibility of measurements methods, evaluation of test results.</p> <p>Introduction of general properties of the paper: production direction, transverse direction, sieve, the upper side, square weight, volume weight.</p> <p>Understanding mechanical properties of paper, snatch, expansion, fracture, laceration, methods of measuring surface hardness. Knowledge of gluing properties, writeability, COBB, PLG, etc.</p> <p>Introduce of advanced paper characteristics, flow, smoothness, etc.</p> <p>Theory of measurement of optical properties, color measurement, whiteness measurement, opacity measurements.</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge</p> <ul style="list-style-type: none"> <li>- Knowledge of the most important basic materials applied in the special area of product design, their production and their application criteria.</li> </ul> <p>b) capabilities</p> <ul style="list-style-type: none"> <li>- Understand and use characteristic online and printed references characteristic of their special field, both in Hungarian and in at least one foreign language.</li> <li>- Know and apply the terminology and special expressions of their professional field in Hungarian and in at least one foreign language.</li> <li>- Adequate perseverance and endurance of monotony to perform practical operations.</li> <li>- Able to give reasons for the decisions related to the product designed, as well as to test them and support them by technical and standard investigation methods.</li> </ul> <p>c) attitude</p> <ul style="list-style-type: none"> <li>- Efforts to comply with legal regulations and to take the ethical rules of engineering into account during work.</li> <li>- Taking care of ensuring equal access opportunities in problem solving.</li> </ul>			
<b>Bibliography:</b>			
1. Dr. Koltai L. :Csomagoló- és papíripari anyagismeret I. OE Jegyzetszám: 6056			
2. Tiefbrunner A.: Csomagolás - Trendek és kérdések, COMPLEX KIADÓ KFT, 2010			
3. Papíripari szaklexikon, Papír-Press kiadó, Budapest, 2002			
4. <a href="https://elearning.uni-obuda.hu/">https://elearning.uni-obuda.hu/</a> electronic notes and aids prepared by the instructor			

<b>Name of subject:</b> <b>ECO Friendly Packaging Materials</b>	<b>NEPTUN-code:</b> RMWKC1EBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 0+0+2	<b>Credit: 2</b> <b>Requirements:</b> practice mark
<b>Course coordinator:</b> Róbert Németh DLA	<b>Title:</b> associate professor	<b>Prerequisite:</b> Material knowledge of paper packaging	
<b>Subject content:</b>			
<p>Environmental design and packaging development in the XXI. century.  Trademarks of ECO friendly packagings.  The relevant environmental laws in packaging industry. Eco profiles of packagings.  Biopolymer packaging materials. Degradation process of plastics. Types and environmental aspects of biodegradable polymer materials. Oxo-degradable polymer materials.  Recycling opportunities of glass, metal and textile packaging materials. Recycling and composting options for paper packaging. Intelligent packagings.</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge  - Knowledge of the most important basic materials applied in the special area of product design, their production and their application criteria.  - Knowledge of the basics, limitations and requirements of the special fields of marketing, management, environment protection, quality assurance, information technology, law, and economics, intrinsically linked to the special area of product design.</p> <p>c) attitude  - Complying and ensuring compliance with the applicable requirement systems of security, health and safety, environment protection, quality assurance and inspection during work.</p>			
<b>Bibliography:</b>			
1. Tiefbrunner A.: Csomagolás – Trendek és kérdések, CompLex, 2010.			
2. Dr. Radonjič Gregor: A környezetbarát csomagolás tervezése és fejlesztése. ECO-HUB program 2007-2013			
4. <a href="https://elearning.uni-obuda.hu/">https://elearning.uni-obuda.hu/</a> electronic notes and aids prepared by the instructor			

<b>Name of subject:</b> <b>Projectwork</b>	<b>NEPTUN-code:</b> RTPPM1PBNE	<b>Number of hours:</b> <i>lec+gs+lab</i> 0+0+2	<b>Credit:</b> 4 <b>Requirements:</b> practice mark
<b>Course coordinator:</b> Rita Kendrovics Boda PhD	<b>Title:</b> associate professor	<b>Prerequisite:</b> Packaging and paper technology III.	
<b>Subject content:</b>			
<p>The purpose of the subject is that the students could use the theoretical knowledge, acquired in the framework of the professional subjects, in practice-oriented projects. The 3-4 strong student groups (occasionally independently as well) learn the workflows – from the raising of the problem through working out the basic ideas, to form experiments – in complex work. The students will get to know the appropriate distribution, time management of the work-phases. They will learn how to make a schedule and to co-ordinate the workflows. After collecting international information and analysing them, students will design products for a given group of firms. They cooperate regularly with their consultants and the competent contact persons of professional organisations and firms. In written form and in presentations, too, the students will report their workflows and results and they will make their portfolios. When carrying out these tasks, in addition to their skill in solving problems, creating forms and in design as well, the adaptability and communication skill of the students will also develop, thus they can get a good background for joining the professional circles.</p>			
<b>Competences to be mastered:</b>			
<p>a) knowledge</p> <ul style="list-style-type: none"> <li>- Knowledge of basic design principles and methods, as well as major production technology procedures and operating processes.</li> <li>- Knowledge of the most important basic materials applied in the special area of product design, their production and their application criteria.</li> <li>- Knowledge of basic construction designs and their dimensioning basics.</li> <li>- Knowledge of the learning, knowledge acquisition, and data collection methods of the special field of product design, their ethical limitations and problem solving techniques.</li> <li>- Knowledge of the most important practical work techniques of their special field.</li> <li>- Knowledge of the ethics and methods of team work.</li> </ul> <p>b) capabilities</p> <ul style="list-style-type: none"> <li>- Able to design the form and construction of relatively simple products by taking into account the limits of production technology, the costs expected, and impacts on the environment.</li> <li>- Able to perform the virtual modelling of product concepts and products using 3D computer-aided design systems as well as to produce their technical documentation.</li> </ul> <p>Able to produce, examine and test real models and prototypes using direct digital production technologies based on both traditional and 3D product models.</p> <ul style="list-style-type: none"> <li>- Able to master new knowledge by solving practical problems empirically.</li> <li>- Understand and use characteristic online and printed references characteristic of their special field, both in Hungarian and in at least one foreign language.</li> </ul>			

- Able to take part in and also to manage team work.
- Able to initiate, compile, and carry out projects in team work, primarily in a multidisciplinary environment.
- Able to take into account the aspects of the historical, cultural, socio-economic and industrial environment in the process of industrial design and product development.
- Able to analyze design projects by applying design methods and to give methodological reasons for the workflows applied.

c) attitude

- Efforts to make self-education in the special area of industrial product design a continuous process in line with professional objectives.
- Efforts to solve tasks and make management decisions by being aware of the opinions of the colleagues supervised, possibly in cooperation therewith.
- Open to transmitting own knowledge to colleagues.
- Taking care to promote subordinates' professional development, to manage and help such endeavors.
- Taking care of ensuring equal access opportunities in problem solving.

***Bibliography:***

1. Zalavári József: A forma tervezése, designökológia. Budapest, Scolar kiadó, 2008
2. <https://elearning.uni-obuda.hu/> electronic notes and aids prepared by the instructor