

Óbuda University  
Rejtő Sándor Faculty of Light Industry and  
Environmental Engineering



**TRAINING PROGRAM**

**Master's Degree in Industrial Design Engineering  
(MSc) (F)**

01 September 2024

CURRICULUM OF THE MASTER OF SCIENCE IN INDUSTRIAL PRODUCT DESIGN  
ENGINEERING

**1. Degree program name:**

Industrial Product Design Engineering

**2. Field of training:**

Agricultural/ economic sciences/ computer science/ engineering/ pedagogical/ natural sciences

**3. Language of training:**

English

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

full-time/part-time 4 semesters, 375 hours per semester

**5. Optional specialisations:**

Product and image design full-time/part-time

**6. Number of credits to be accumulated for the MSc degree:**

120 credits

**7. Level of qualification and indication of the qualification in the diploma:**

- level of qualification: master (magister, master; abbreviation: MSc)

- qualification: Industrial Product Design Engineer

**8: The field of study classification of the qualification according to the uniform classification system for the fields of training:**

214/0212

**9. Training goal:**

The aim of the program is to train industrial product design engineers who are able to respond flexibly and effectively to the challenges of a globalising market economy. With their technical-scientific, economic, human, linguistic and design skills, they are able to work independently in all phases of product development and to lead creative teams in small, medium and large enterprises in Hungary and internationally. They are prepared to work in research and development and to acquire further knowledge independently. They are prepared to continue their studies at doctoral level.

**10. The professional competences to be acquired:**

Industrial Product Design Engineer

## **a) knowledge**

- Detailed knowledge and understanding of the theory and practice related to product development and design.
- Knowledge of the materials used in product design, their composition, properties, applications and the relationship between material properties and processing.
- A detailed knowledge and understanding of modern design principles and methods, traditional and specialised manufacturing processes and operational procedures.
- Understands the social ideals and lifestyles of his/her time and their impact on the product formed.
- Knowledge of management tasks and activities and the legislation required to exercise the profession.
- Knowledge and understanding of computer modelling and simulation tools and methods relevant to industrial product design engineering.
- Knowledge of the basic requirements of environmental protection, quality, consumer protection, product liability, the principle and application of equal access, occupational health and safety, technical and economic legislation and engineering ethics.
- Detailed knowledge of a wide range of problem-solving techniques for research or scientific work.

## **b) abilities**

- Ability to design complex, innovative products in terms of form and construction, considering manufacturing technology constraints, expected costs and environmental impact.
- Ability to design the whole product life cycle in an independent and creative way, taking into account aesthetic, utility, market, environmental, durability, safety, feasibility and ethical aspects, using design methodology.
- The ability to develop theoretical knowledge independently to solve unconventional problems in the design and construction of complex products and to apply new theory to the practical solution of the problem.
- The ability to think analytically, synthesise knowledge and solve problems creatively, based on a broad professional knowledge base.
- The ability to process information from the knowledge frontiers of professional experience in the discipline, new problems and new phenomena that arise.
- The ability to formulate a sound judgement or opinion, to make decisions and to draw conclusions based on the information available.
- Ability to take on leadership roles in companies and research organisations, including administrative roles.
- Ability to work in an international environment through social and cultural sensitivity and language and communication skills.
- Ability to design new and original products and product-service combinations to meet the needs of the individual customer, based on a balance of interests between designer, user, industry and society, respecting international ethical standards and expectations.
- Ability to see the whole innovation and product development process through, and to implement and manage the process either independently or as part of a team or as a leader, often in an international environment.
- Ability to consider and integrate related technical, human, aesthetic and environmental issues in product development.

- Ability to justify and test decisions related to the designed object and to support them with technical and applied scientific research results and methods.
- Ability to systematically analyse product features and develop them in a cost-effective way.
- Ability to explore and interpret the deeper market-customer-production-environment relationships in product design
- Ability to apply the rules for the preparation of product documentation
- Ability to apply computer modelling, simulation tools and methods related to the product design discipline, advanced 3D modelling and manufacturing processes, and rapid prototyping systems.
- Ability to manage teamwork through a broad range of professional skills and problem-solving.
- Ability to set new objectives and define the steps to achieve them, and initiate, assemble and implement complex projects, especially in a multidisciplinary environment.
- Commitment to health, its promotion and safety culture, as well.

### **c) attitude**

- Receptive to solving environmental problems throughout the life cycle of products and striving to meet the requirements of sustainability and health consciousness.
- In solving problems, creativity, flexibility and respect for engineering ethics are the hallmarks of his work.
- He/she will strive to maintain continuous self-learning in product design and related areas, consistent with his/her professional goals.
- Independently selects and applies relevant problem-solving methods to solve market, customer and quality problems.
- He/she is committed to progress, improving the quality of human life, preserving environmental balance and values, and promoting sustainability.
- He/she is characterised by openness to innovation.
- He/she is committed to high-quality work and strives to communicate this approach to his/her team.
- He/she is committed to ensuring equal access to all in problem solving.
- Takes into account the historical, cultural, socio-economic and industrial context in the process of industrial design and product development.

### **d) autonomy and responsibility**

- He/she shall be responsible for the findings and professional judgements made in his/her opinion and for the work carried out by him/her or under his/her authority.
- He/she takes his/her decisions independently, in consultation with and under the responsibility of other disciplines (in particular legal, economic, energy, environmental, architectural, medical).
- In making decisions, he/she considers the principles and applications of environmental protection, quality, consumer protection, product liability, equal access, health and safety at work, technical, economic, and legal regulations, ergonomics and psychology, and engineering ethics.
- He/she operates in accordance with the requirements of quality and environmental management systems.

## **11. Main areas of training:**

<b>Professional characteristics according to EMMI Decree 18/2016 (VIII. 5.)</b>	<b>Credit points</b>
<b>Natural sciences (20-35 credits)</b>	<b>24</b>
<b>Economic and human sciences (10-20 credits)</b>	<b>13</b>
<b>Industrial product design engineering specific knowledge (15-35 credits)</b>	<b>35</b>
- Technical design skills: 10-25 credits	22
- Design skills: 6-15 credits	13
<b>Technical design skills: 10-25 credits</b>	<b>46</b>
-Thesis (30 credits)	30
-Elective knowledge (minimum 6 credits)	16
<b>Physical education</b>	<b>2</b>
<b>Total</b>	<b>120</b>

## **12. Criteria requirements:**

Work placement is a continuous placement of at least four weeks in a work placement, the further requirements of which are specified in the curriculum. The internship is a criterion requirement, closely linked to the thesis.

Physical Education. The course is taught in semesters 1-2 of the model curriculum with 1 hour per week load, and 6 hours per semester in correspondence courses.

## **13. Foreign language requirements (for the degree):**

The linguistic criterion for the award of the diploma is the passing of an internal language examination. The internal language examination is based on a knowledge of the language corresponding to level B2 of the Common European Framework of Reference for Languages (CEFR) and a knowledge of the professional language of the training.

## **14. Knowledge verification:**

- a) by means of written or oral report, a written (final) paper or a homework assignment (plan, measurement report, etc.), a mid-term mark or a signature,
- (b) by preliminary examination during the period of study,
- (c) by examination or test during the examination period, and
- (d) by final examination.

## **15. Conditions for passing the final examination:**

- a) Obtaining a final certificate (diploma),
- b) A thesis accepted by the examiner.

The final examination is conditional upon the award of a diploma. The higher education institution issues the final certificate to students who have fulfilled the study and examination requirements, completed the professional practice prescribed in the curriculum, and obtained the required number of credits, except for the foreign language requirement and the thesis.

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

The final examination consists of the defence of the thesis and oral examinations in the subjects prescribed in the curriculum (with at least 30 minutes of preparation time per subject), which the student must take consecutively on one day.

The set of questions for the oral examination is sent to the candidates 30 days prior to the final examination.

Candidates will be allowed to start the examination if the final examination committee has approved their thesis with a grade of at least satisfactory (2). The conditions for correcting unsatisfactory theses are determined by the competent institute.

#### **17. Final examination results:**

The weighted average of the marks obtained for the diploma thesis and the oral part of the final examination, considering the number of subjects in the final examination, as follows:

$$F = (Th + S1+S2+...+Sm)/(1+m)$$

#### **18. Conditions for issuing a certificate:**

- a) Successful final examination,
- b) Successful completion of the foreign language requirement.

#### **19. Possibility of dual training: -**

#### **20. Possibility of cooperative education: - -**

#### **21. Number of credits to be taken into account for further studies in the field of training: -**

#### **22. Entry into force: 1 September 2024.**

**1 September 2024.**

Dr. habil. László Koltai Ph.D

Dean

# **CURRICULUM**

# **FULL-TIME TRAINING**



Obuda University Rejtő Sándor Faculty of Light Industry and Environmental Engineering		MSc Curriculum Full time training Industrial Design Engineering MSc Product Design and Visual Identity Specialisation		Accepted by the RKK Council: 16.05.2024. Decision number: RKK-KT-C/III/209/2024 Valid: 1. September 2024.															
		Course coordinator: Prof. Dr. Márta Kisfaludy DLA																	
		Weekly teaching hours (Wh), Lecture (L), Classroom work (Cw), Laboratory work (Lw), Requirements (R), Exam (E), Term mark (Tm), Credits (Cr), Signature (S)																	
Code	Subjects	Wh	Cr	Semester												Required prelineary knowledge Code			
				1.			2.			3.			4.						
				L	Cw	R	Cr	L	Cw	R	Cr	L	Rw	R	Cr	L	Cr	R	Cr
<b>Fundamentals of Natural Sciences: 20-35 credits</b>																			
1. RXXMTEWNF	Applied Mathematics	22	24	5	7	12	3	7	12	0	0	0	0	0	0	0	0	0	0
2. RTXSM1EWNF	Computer Modeling I.	4	4	2	2	e	4												
3. RTXSM2EWNF	Computer Modeling II.	4	4	1	3	tm	4												
4. RKXMF1EWNF	Physics for Engineers	3	4					1	3	e	4								
5. RTXKI1EWNF	Research and Innovation (blended)	4	4	2	2	tm	4												
6. RTXAT1EWNF	Material Science	3	4					1	2	e	4								
<b>Economic and Human Knowledge: 10-20 credits</b>																			
7. RMXME1EWNF	Organisational and Management Knowledge (blended)	4	4	10	13	2	2	5	1	1	4	2	2	4	0	0	0	0	0
8. RTEAE1EWNF	Applied Ergonomics (blended)	2	4									1	1	tm	4				
9. RTXKD1EWNF	Contemporary Design and Innovative Technologies	4	5	2	2	tm	5												

Dr. habil Koltai László  
Dean

Weekly teaching hours (Wh), Lecture (L), Classroom work (Cw), Laboratory work (Lw), Requirements (R), Exam (E), Term mark (Tm), Credits (Cr), Three-level assessment (T)

Code	Subjects	Wh	Cr	Semester												Required prelineary knowledge			
				1.			2.			3.			4.			L	Cr		
				L	Cw	Cr	L	Cw	Cr	L	Cw	Cr	L	Cw	Cr				
<b>Knowledge specific to industrial product design engineering: 15-35 cr.</b>				19	22	0	3	4	0	4	4	0	8	9	0	4	5		
10.	RTWWT1EMNF	4	4									0	4	tm	4				
11.	RTWWT2EMNF	4	4									0	4	tm	4				
12.	RTWT1EMNF	3	4			0	3	tm	4										
13.	RTWTT2EMNF	4	4							0	4	tm	4						
14.	RTWTT3EMNF	4	4																
<b>Design Knowledge: 6-15 credits</b>				10	13	1	2	4	3	4	9	0	0	0	0	0	0		
15.	RTWF1EMNF	4	5							2	2	tm	5						
16.	RTWT1EMNF	3	4			1	2	tm	4										
17.	RTWKT1EMNF	3	4							1	2	tm	4						
<b>Credit Value of the Optional Knowledge with the Thesis: 40-60 credits</b>				14	46	0	2	4	0	0	0	4	2	18	2	4	24		
18.	RTWS1EMNF	2	4																
19.	RMXTB1EMNF	2	4										2	0	e	4			
20.	RTWGT1EMNF	2	4													2	0	tm	4
21.	RTWET1EMNF	2	4													2	0	tm	4
22.	RTDSD1EMNF	2	10													0	2	tm	10
23.	RTDSD2EMNF	4	20													0	4	tm	20
<b>Mandatory Subjects to be Completed</b>				2	2														
24.	Physical Education I.	1	1			0	1	t	1										
25.	Physical Education II.	1	1							0	1	t	1						
<b>Mindeösszesen:</b>				77	120			29		29		29		31		29			
<b>Total hours:</b>				8	16			7	16		6	12		2	8				
<b>Term mark:</b>				24				23		18		10							
<b>Exam:</b>																			
<b>Lecture hours</b>				23	29,87 %														
<b>Practice hours</b>				52	67,53 %														

The diploma is awarded on completion of at least 4 weeks of work experience.

- Subjects of the Final Exam:
1. Integrated Product Design Project II.-II; Applied Ergonomics
  2. Subject depending on specialisation:  
- Design and Visual Identity  
- Virtual Product Development I. - II.

Dr. habil Koltai László  
Dean

## **PART -TIME TRAINING**

<b>Obuda University</b>		<b>MSc Curriculum</b>		Accepted by the RKK Council: 16.05. 2024.																	
<b>Rejtő Sándor Faculty of Light Industry and Environmental Engineering</b>		<b>Part-time training</b>		Decision number: RKK-KT-CIII/207/2024																	
<b>Product Design and Visual Identity Specialisation</b>		<b>Industrial Design Engineering MSc</b>		Valid: 1. September 2024.																	
Course coordinator: Prof. Dr. Márta Kisfaludy DLA																					
Weekly teaching hours (Wh), Lecture (L), Classroom work (Cw), Laboratory work (Lw), Requirements (R), Exam (E), Term mark (Tm), Credits (Cr), Signiture (S)																					
Code	Subjects	Wh	Cr	Semester												Required prelineary knowledge					
				1.			2.			3.			4.								
				L	Cw	R	Cr	L	Cw	R	Cr	L	Rw	R	Cr	L	Cr	R	Cr		
<b>Fundamentals of Natural Sciences: 20-35 credits</b>																					
1. RXXMATEMLF	Applied Mathematics	110	24	25	35	12	15	35	12	0	0	0	0	0	0	0	0	0	0		
2. RTXSMTEMLF	Computer Modeling I.	20	4	10	10	e	4														
3. RTXSMTEMLF	Computer Modeling II.	20	4	5	15	tm	4														
4. RXXMFTEMLF	Engineering Physics	20	4					5	15	e	4									RTXSMTEMLF	
5. RTXKI1EMLF	Research and Innovation (blended)	20	4	10	10	tm	4														
6. RTXAT1EMLF	Material Science	15	4					5	10	e	4										
<b>Economic and Human Knowledge: 10-20 credits</b>																					
7. RXXME1EMLF	Organisational and Management Knowledge (blended)	20	4	50	13	10	10	5	5	5	4	10	10	4	0	0	0	0			
8. RTEAE1EMLF	Applied Ergonomics (blended)	10	4									10	10	e	4						
9. RTXKD1EMLF	Contemporary Design and Innovative Technologies	20	5	10	10	tm	5														
Dr. habil Koltai László Dean																					

Course coordinator: Prof. Dr. Mária Kisfaludy DLA

Weekly teaching hours (Wh), Lecture (L), Classroom work (Cw), Laboratory work (Lw), Requirements (R), Exam (E), Term mark (Tm), Credits (Cr), Three-level assessment (T)

Code	Subjects	Wh	Cr	Semester												Required prelineary knowledge			
				1.			2.			3.			4.			L	Cr		
				L	Cw	R	Cr	L	Cw	R	Cr	L	Cw	R	Cr	L	Cr		
<b>Knowledge specific to industrial product design engineering: 15-35 kr.</b>																			
	<b>Engineering Design Skills: 10-25 credits</b>	95	22	0	15	4	0	20	4	0	20	4	0	40	9	0	20	5	
10.	RTWVT1EMLF Virtual Product Development I.	20	4									0	20	tm	4				
11.	RTWVT2EMLF Virtual Product Development II.	20	5													0	20	tm	
12.	RTWIT1EMLF Integrated Product Design Project I.	15	4	0	15	tm	4											RTWVT1EMLF	
13.	RTWTT2EMLF Integrated Product Design Project II.	20	4					0	20	tm	4							RTWIT1EMLF	
14.	RTWTT3EMLF Integrated Product Design Project III.	20	5									0	20	tm	5			RTWTT2EMLF	
<b>Design Knowledge: 6-15 credits</b>																			
15.	RTWFA1EMLF Design and Visual Identity	20	5	5	10	4	15	20	9	0	0	9	0	0	0	0	0	0	
16.	RTWTI1EMLF Typography	15	4	5	10	tm	4												
17.	RTWKT1EMLF Construction and Technology Skills	15	4					5	10	tm	4								
<b>Credit Value of the Optional Knowledge with the Thesis: 40-60 credits</b>																			
18.	RTWSH1EMLF Professional Foreign Language	10	4	0	10	tm	4	0	0	0	0	20	10	18	10	20	24		
19.	RWXTB1EMLF Product Safety (blended)	10	4									10	0	e	4				
20.	RTWGT1EMLF History of Graphic Design	10	4												10	0	tm	4	
21.	RTWET1EMLF History of Interior Design	10	4									10	0	tm	4				
22.	RTDSD1EMLF Diploma Design I.	10	10									0	10	tm	10				
23.	RTDSD2EMLF Diploma Design II.	20	20												0	20	tm	20	
<b>Mandatory Subjects to be Completed</b>																			
24.	Physical Education I.	6	1	0	6	t	1												
25.	Physical Education II.	6	1					0	6	t	1							Physical Education I.	
				<b>Mindösszesen: 387</b>												<b>120</b>	<b>29</b>	<b>31</b>	<b>29</b>
<b>Total hours:</b>				40	80			35	80			30	60			10	40		
<b>Term mark:</b>				120				115			90				50				
<b>Exam:</b>						6				4				4		3		0	
<b>Lecture hours</b>		115	29,72 %																
<b>Practice hours</b>		260	67,18 %																

The diploma is awarded on completion of at least 4 weeks of work experience.

Subjects of the Final Exam:

1. Integrated Product Design Project II.-III.; Applied Ergonomics
2. Subject depending on specialisation:  
- Design and Visual Identity  
- Virtual Product Development I.-II.

Dr. habil. Kolta László  
Dean

## **SUBJECT DESCRIPTIONS**

# FUNDAMENTALS OF NATURAL SCIENCES

<b>Title of the course:</b> Applied mathematics	<b>NEPTUN-code:</b> RKXMATEMNF RKXMATEMLF	<b>Weekly teaching hours:</b> l+cw 2+2 10+10	<b>Credit:</b> 4 <b>Requirements:</b> exam
<b>Course leader:</b> Ágnes Bálint Mészárosné Ph.D.	<b>Position:</b> associate professor	<b>Required preliminary knowledge:</b> -	
<b>Course Description:</b>			
<p>The aim of applied mathematics is to provide students with mathematical knowledge that can be applied in their MSc studies and in professional practice.</p> <p>Linear combinations of vectors, linear independence, linear correlation, generator system, basis (and their E.B.T. solution). Matrices (addition, scalar multiplication, multiplication, inverse, rank and their properties). Systems of linear equations. Extreme values of bivariate functions. Extreme values of multivariable functions. Conditional extremum search. Regression calculation. Methods of searching for zero space (Bolzano theorem, Newton's method). Numerical integration methods (trapezoid, tangent and Simpson's formula). Numerical differential equation solving methods. Lagrange and Hermite interpolation. Integral calculus of multivariable functions, applications. Determinants. Quadratic forms (matrix, integral to quadratic, definiteness). Basic concepts of graph theory. Spline function.</p>			
<b>Detailed description of the subject:</b>			
<b>Weeks</b>	<b>Topics of lectures and exercises</b>		
1.	Linear algebra: vector space, linear combinations, independence, basis, linear basis transformations, systems of linear equations.		
2.	Problems for the Gauss-Jordan elementary basis transformation. Systems of parametric linear equations		
3.	Addition, scalar multiplication, multiplication, inverse, rank of matrices and their properties.		
4.	Exercises for matrix operations.		
5.	Test 1. Eigenvalue, eigenvector, quadratic forms, conversion to a complete square.		
6.	Functions of two and more variables: limit, continuity, partial derivatives, extremal value.		
7.	Exercises for determining extreme values of bivariate and multivariate functions; stationary points.		
8.	Theoretical paper. Conditional extremal value search. Regression calculation.		
9.	Methods of searching for zero space (Bolzano theorem, Newton's method). Integration and applications.		
10.	Spatial integral. Calculation of estimates from measurements using regression equation.		
11.	Numerical integration methods (trapezoid, tangent and Simpson formula).		
12.	Vector functions		
13.	Test 2.		
14.	Basic concepts of graph theory.		



<b><i>Mid-semester requirements:</i></b>
<b><i>Method of obtaining a signature:</i></b>
<p>To obtain a signature, the students must write the two tests (30%) and complete the class assignments. A total of 100 points will be awarded for the final papers, and those who achieve at least a medium level will be offered an examination mark:</p> <p>0-29 points signature refused  30-49 points signature  50-61 points satisfactory  62-73 points medium  74-85 points good  86-100 points excellent</p> <p>Students who do not achieve 30% in the tests may write a supplementary test in the last week of the semester or, if they fail, they may obtain a signature in a substitute examination in accordance with the TVSZ.</p>
<b><i>Professional competencies:</i></b>
<ul style="list-style-type: none"> <li>- Detailed knowledge and understanding of theory and practice related to product development and design.</li> <li>- Detailed knowledge of a wide range of applicable problem-solving techniques for research or scientific work.</li> </ul>
<b><i>Bibliography:</i></b>
<ol style="list-style-type: none"> <li>1. Anton, H., Rorres, C.: Elementary Linear Algebra with Applications, 9e, Wiley, 2005, ISBN: 0-471-66959-8.</li> <li>2. Thomas, G.B. et al.: Thomas' Calculus, 11e, Addison-Wesley, 2005, ISBN: 0-321-18558-7.</li> <li>3. Gilbert Strang: Linear Algebra for Everyone, Wellesley Cambridge Press, ISBN 9781733146630, 2020</li> <li>4. Douglas C. Montgomery-Elizabeth -A Peck, G. Geoffrey Vining: Introduction to Linear Regression Analysis, Yohn Wiley &amp; Sons, INC. ISBN 0 471 31565 6, 2001</li> <li>5. <a href="https://elearning.uni-obuda.hu/">https://elearning.uni-obuda.hu/</a> electronic notes and help files prepared by the instructor</li> </ol>

<b>Title of the course:</b> <b>Computer modelling I.</b>	<b>NEPTUN-code:</b> RTXSM1EMNF RTXSM1EMLF	<b>Weekly teaching hours:</b> <i>l+cw</i> 1+3 5+15	<b>Credit:</b> 4 <b>Requirements:</b> term mark
<b>Course leader:</b> Gabriella Oroszlány Ph.D.	<b>Position:</b> senior lecturer	<b>Required preliminary knowledge:</b> -	
<b>Course Description:</b>			
<p>Within the scope of the subject, students will learn about the tools and methods related to computer modelling and simulation in the field of product design, modern 3D modelling and manufacturing processes, and rapid prototyping systems.</p> <p>The concept of computer-aided design (CAD). Mastering advanced use of Adobe programs through case studies. Desktop publishing, pattern making, image processing, branding, and optimising graphic designs for various platforms.</p> <p>Geometric modelling and product modelling. Modelling and prototyping procedures. Digital prototyping and visualisation techniques.</p>			
<b>Detailed description of the subject:</b>			
<b>Weeks</b>	<b>Topics of lectures and exercises</b>		
1.	Introduction to the user interface and operating principles of Rhinoceros 4.0, a 3D NURBS-based graphic modelling program.		
2.	Explanation of absolute coordinate systems, relative coordinate systems, angle coordinates, and layers.		
3.	Applications of the Osnap command in geometric modelling.		
4.	Adding and subtracting volumes of solids (Difference, Boolean Difference).		
5.	Use of fillet edge and chamfer edge, and demonstration of the loft feature.		
6.	Applying copy, rotate, and mirror.		
7.	Reconstructing regular shapes and exploring the possibilities of distorting these shapes using their control points.		
8.	Creating complex spatial forms using three-dimensional projections.		
9.	Drawing objects on work surfaces (viewports), performing operations on different projection planes, and drawing lines, complex lines, and open planar figures.		
10.	Operations with complex lines and curves, extrusion, and patching possibilities of freeform surfaces. Application of copy, rotate, and mirror commands.		
11.	Modifying lines using their control points and converting them into surfaces. Using the sets point palette and exploring the possibilities of distorting regular shapes using their control points.		
12.	Operations with 3D objects (Cap planar holes, Extract surface, Trim, Split). Fitting surfaces of different qualities and methods for checking their continuity.		
13.	Rendering in V-Ray and preparing objects for 3D printing. Presentation of the settings options for the MakerBot Replicator 3D printer. Submission of assignments.		
14.	Evaluation.		
<b>Mid-semester requirements:</b>			
<p><b>Participation in occupations:</b> Attendance at exercises and lectures is compulsory, the absence rate is regulated by the TVSZ.</p>			

**Tests, minutes, reports, etc.**

Week 13: 3D photo-realistic visual presentation of 3 designs

Week 13: submission of 1 individual assignment.

Week 14: Assessment

**Method of obtaining a mid-term mark:**

The method used for the mid-year mark: classwork and individual assignments are assessed.

***Professional competencies:***

- Knowledge of the materials used in product design, their composition, properties, applications and the relationship between material properties and processing.
- Detailed knowledge and understanding of modern design principles and methods, traditional and specialised manufacturing processes and operational procedures.
- Knowledge and understanding of the tools and methods of computer modelling and simulation relevant to industrial product design engineering.
- Ability to design complex, innovative products in terms of form and construction, taking into account manufacturing technology constraints, expected costs and environmental impacts.
- Ability to systematically analyse product functions and design them cost-effectively.
- Ability to apply tools and methods of computer modelling and simulation related to the product design discipline, advanced 3D modelling, manufacturing processes and rapid prototyping systems.

***Bibliography:***

1. Self-published user manual for current Adobe programs.
2. Ron K. C. Cheng: Inside Rhinoceros 5, Cengage Learning Production, USA, Stamford, 2013.
3. Ciro Sannino: Photography & Rendering, GC edizioni, Canada, 2013. ISBN 978-88-88837-28-4
4. Learning Rhino 5.0 Training DVD – Tutorial Video, Infinite Skills, Author: Bob Mc Culloch

<b>Title of the course:</b> <b>Computer Modelling II.</b>	<b>NEPTUN- code:</b> RTXSM2EMNF RTXSM2EMLF	<b>Weekly teaching hours:</b> <i>l+cw</i> 1+3 5+15	<b>Credit:</b> 4 <b>Requirements:</b> exam
<b>Course leader:</b> Gabriella Oroszlány Ph.D	<b>Position:</b> senior lecturer	<b>Required preliminary knowledge:</b> RTXSM1EMNF, RTXSM1EMLF	
<b>Course Description:</b>			
<p>In this course, students will learn advanced 3D object and interior rendering techniques, editing principles and the structure of the Rhinoceros 3D rendering methods. They will gain insight into current trends in 3D spatialisation in contemporary design and interior design.</p> <p>To learn the advanced use of 3D programs appropriate to the specialisation through case studies. Master CAD/CAM design, UX, UI design programs.</p> <p>Design process modelling, virtual product creation. Creating a part drawing in two or three dimensions based on the virtual model.</p> <p>Creating visual designs based on "parts". Document the assembly in 2D. Methods of producing an integrated virtual product. Case studies in a virtual engineering environment.</p>			
<b>Detailed description of the subject:</b>			
<b>Weeks</b>	<b>Topics of lectures and exercises</b>		
1.	Description of the tasks and software used during the semester.		
2.	Absolute coordinate system, relative coordinate system, angular coordinates. Introduction to Skeleton and Bottom-Up modelling.		
3.	Use of Split, Extend, and Offset tools. Using Array polar, Array rectangular. Historical overview and introduction to photo-realistic modelling		
4.	Operations with 3d objects (Cap planar holes, Extract surface, Trim, Split) 3D printing basics.		
5.	Drawing straight lines, compound lines, open plane lines and converting open lines to surfaces. Assembling solids. 1D, 2D, 3D scaling options.		
6.	Drawing in elevator mode on different viewports. Using pipe effect. Introduction to layers, assigning colour and surface to objects. Simple rendering in Rhino. Options for setting surface properties, lighting, changing light parameters, saving render.		
7.	Operations with complex lines and curves. Extrusion, patching options for free surfaces. Addition and subtraction of volumes of solids. (Difference, Boolean Difference) Application of fillet edge, chamfer edge.		
8.	Modifying straight lines using their control points and converting to surfaces. Using Sets point palette. Reconstruction of regular shapes, then distortion of regular shapes using their control points.		
9.	Modelling objects of your choice from a technical drawing 1.		
10.	Modelling objects of your choice from a technical drawing 2.		
11.	Drawing of individual designs, rendering of individual designs, preparation of product presentation 1.		
12.	Drawing of individual designs, rendering of individual designs, preparation of product presentation 2.		
13.	Test		
14.	Evaluation. Supplementary test.		
<b>Mid-semester requirements:</b>			
<p><b>Participation in occupations:</b></p> <p>Attendance at the exercises is compulsory, the level of absence is regulated by the TVSZ. Attendance at lectures is recommended, subject to the rules laid down in the TVSZ.</p>			

**Tests, minutes, reports, etc.**

Week 13: ZH. and submission of individual plans

Week 14: Exams, assessment

Independent solution of 3 homework assignments during the semester.

**The method of obtaining a signature / mid-term mark:**

The requirement to obtain a signature:

Completion of class assignments and individual assignment solutions will be graded on a weighted basis.

The examination is written. The assignments will be graded on the basis of a weighted grade of 60% of the assignment solution. The assessment will be based on the assessment of 60% of the marks. Substitution according to the TVSZ.

***Professional competencies:***

- Knowledge of the materials used in product design, their composition, properties, applications and the relationship between material properties and processing.
- Detailed knowledge and understanding of modern design principles and methods, traditional and specialised manufacturing processes and operational procedures.
- Knowledge and understanding of the tools and methods of computer modelling and simulation relevant to industrial product design engineering.
- Ability to design complex, innovative products in terms of form and construction, taking into account manufacturing technology constraints, expected costs and environmental impacts.
- Ability to systematically analyse product functions and design them cost-effectively.
- Ability to apply tools and methods of computer modelling and simulation related to the product design discipline, advanced 3D modelling, manufacturing processes and rapid prototyping systems.

***Bibliography:***

1. Self-published user manual for current Adobe programs.
2. Mary Ann Fugier- Pascal Golay- Jerry Hambly- Vanessa Steeg: Rhinoceros@modeling tools for designers - Training Manual. Robert McNeel & Associates. 2020.
3. Ron K. C. Cheng: Indide Rhinoceros 5, Cengage Learning Production, USA, Stamford, 2013.
4. Ciro Sannino: Photography & Rendering, GC edizioni, Canada, 2013. ISBN 978-88-88837-28-4
5. Learning Rhino 5.0 Training DVD – Tutorial Video, Infinite Skills, Author: Bob Mc Culloch
6. Andre Kutscherauer: 3D Car modelling with Rhinoceros, Urheberrechtlich Geschützes Material, Germani/Munich, 2011. ISBN 978-3-00 034288-2

<b>Title of the course:</b> Physics for Engineers	<b>NEPTUN- code:</b> RKXMF1EMNF RKXMF1EMLF	<b>Weekly teaching hours:</b> l+cw 1+2 5+10	<b>Credit:</b> 4 <b>Requirements:</b> exam
<b>Course leader:</b> Lóránt Szabó Ph.D.	<b>Position:</b> senior lecturer	<b>Required preliminary knowledge:</b> -	
<b>Course Description:</b>			
<p>The aim is to equip industrial product and design engineers with the necessary physical knowledge, thinking and problem-solving skills. Emphasis will be placed on the physical basis of testing methods important in engineering applications and on the physical interpretation of the properties of materials used. The course will prepare students in the master's programme to analyse, select and prepare materials for their professional work, based on sound scientific knowledge and a modern approach.</p> <p>Mechanical properties of solids, basics of elasticity and plasticity. Introduction to quantum physics. Physical properties of crystalline solids, methods of analysis.</p> <p>Basics of physics of metals and semiconductors. Polarisation of insulating materials. Generation of electrostatic charges. Electrostatic discharges. Practical problems of charging of bodies, liquids and powders.</p> <p>Magnetic properties of materials and their microscopic interpretation. Thin films. Absorption and dispersion. Crystal optics. Lasers. Basics of physics of polymers, amorphous materials, liquid crystals, and glasses</p>			
<b>Detailed description of the subject:</b>			
<b>Weeks</b>	<b>Topics of lectures and exercises</b>		
1.	Introduction, description of the semester		
2.	Free electron theory of metals.		
3.	Electron and quantum physics problems		
4.	Crystal lattices. Reciprocal lattice, X-ray diffraction.		
5.	Grid structure, diffraction calculation		
6.	Energy bands.		
7.	Problems with metals and semiconductors		
8.	Dielectrics. Electrostatic charges.		
9.	Optical properties of solids. Thin films.		
10.	Magnetic properties.		
11.	Calculation of diameters and paramagnetic properties		
12.	Repetitions, preparation for the written report.		
13.	Written report.		
14.	Completion of written report. Evaluation.		
<b>Mid-semester requirements:</b>			
<b>Participation in occupations:</b> Attendance at lectures and tutorials is compulsory, and the level of absence is regulated by the TVSZ.			
<b>Tests, minutes, reports, etc.</b> Week 13: Written report Week 14: Completion of written report, evaluation.			
<b>The method of obtaining a signature / mid-term mark:</b> One written report is required during the semester. A minimum of 19 points out of 50 is required to obtain a signature. The examination is written and consists of problem solving and question answering. A total of 50 points can be obtained. The assessment criteria are: 0-19 points:			

unsatisfactory (1), 20-28 points: satisfactory (2), 29-36 points: average (3), 37-43 points: good (4), 44-50 points: excellent (5).

***Professional competencies:***

- Detailed knowledge of a wide range of problem-solving techniques for research or academic work.

***Bibliography:***

1. S. Blundell: Magnetism in Condensed Matter (Oxford University Press, 2001).
2. J. Singleton: Band Theory and Electronic Properties of Solids (Oxford University Press, 2001).
3. N. W. Ashcroft, D. N. Mermin, D. Wei: Solid State Physics (Cengage Learning, revised edition: 2016)
4. Shankar, R.: Fundamentals of Physics II: Electromagnetism, Optics, and Quantum Mechanics. Yale University Press, 2016.
5. <https://elearning.uni-obuda.hu/> electronic notes and help files prepared by the teacher.

<b>Title of the course:</b> <b>Research and Innovation (blended)</b>	<b>NEPTUN- code:</b> RTXKI1EMNF RTXKI1EMLF	<b>Weekly teaching hours:</b> <i>l+cw</i> 2+2 10+10	<b>Credit:</b> 4 <b>Requirements:</b> term mark
<b>Course leader:</b> Prof. Marianna Halász Ph.D	<b>Position:</b> professor	<b>Required preliminary knowledge:</b> -	
<b>Course Description:</b>			
<p>The aim of the course is to provide the student with an understanding of scientific research methodology, development directions and the process of innovation. It will take the student from literature research, through secondary data collection and processing, to empirical primary research and its publication and presentation for scientific purposes. It will cover in detail the commonly used qualitative, quantitative and composite methods of scientific research. The research design is followed by measurements, scales, sampling characteristics, experiments and questionnaires, and then data analysis. Students will also acquire specific knowledge of the rules for preparing scientific works, articles, studies and reports, and the principles and practice of referencing.</p> <p>The course also includes a discussion of the problems of students' personal research, current trends in product innovation and development, and ethical, political, legal and economic issues in research.</p>			
<b>Detailed description of the subject:</b>			
<b>Weeks</b>	<b>Topics of lectures and exercises</b>		
1.	Introduction, Basic concepts. Types of scientific works, general structure.		
2.	Steps and methods of the research process. Key issues in the research process: Experimental design, processing and analysis of experimental data.		
3.	Purpose and methods of researching the literature and processing the literature.		
4.	Managing references and bibliographic citations.		
5.	Objective measures of the performance of the scientific institution or scientist. Publication databases, publication in journals, conference proceedings.		
6.	Funding applications for scientific research. Ethical, political, legal and economic issues of research. Patents.		
7.	Claims of creation. Drivers of innovation.		
8.	Types of innovation. Innovation strategy.		
9.	Process of creation 1. Brainstorming, selection.		
10.	Process of creation 2. Implementation of innovation projects and exploitation of results.		
11.	Object of creation 1. Development of new products and services.		
12.	Object of creation 2. Business process innovation, business model innovation.		
13.	Test.		
14.	Creator's toolbox. Tools to support creativity. Tools and methods to support innovation from idea to success. Evaluation.		
<b>Mid-semester requirements:</b>			
<b>Participation in occupations:</b> Attendance at exercises and lectures is compulsory.			



**Tests, minutes, reports, etc.:**

Exercise 1 - Literature work on a chosen topic

Exercise 2 - Test

**The method for calculating the mid-semester grade:**

The mid-semester grade is the average of the grade received for the literature assignment and the grade received for the final paper.

***Professional competencies:***

- In-depth knowledge of a wide range of problem-solving techniques for research or academic work.
- Skilled in searching, processing, citing literature, and critically evaluating publications.
- Ability to justify and test decisions on planned projects and support them with technical and applied scientific research results and methods.
- Ability to see the whole process of innovation and product development and to implement and manage the process, either independently or as part of a team or as a leader, in a national and international context.
- Ability to develop an independent research plan and to conduct the research afterwards. Knowledge of key methodological techniques and analytical procedures, ability to analyse and publish the research process and the data obtained.

***Bibliography:***

1. William M. K. Trochim, James P Donnelly: The Research Methods Knowledge Base, Cornell University, 2006
2. Christensen Clayton M.: The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail" by Clayton M. Harvard Business Review Pr, 2024. ISBN: 9781647826765
3. John W. Creswell and J. David Creswell: Research Design: Qualitative, Quantitative, and Mixed Methods Approaches" SAGE Publications Inc, 2018.

<b>Title of the course:</b> <b>Material Science</b>	<b>NEPTUN- code:</b> RTXAT1EMNF RTXAT1EMLF	<b>Weekly teaching hours:</b> <i>l+cw</i> 1+2 5+10	<b>Credit:</b> 4 <b>Requirements:</b> exam
<b>Course leader:</b> László Koltai PhD habil	<b>Position:</b> associate professor	<b>Required preliminary knowledge:</b> -	
<b>Course Description:</b>			
<p>The aim is to cover topics in materials science in line with the basic knowledge acquired by students in product design during their previous studies and the expectations of their future professional subjects.</p> <p>To introduce natural, natural-based man-made and synthetic polymers as basic materials for materials science research. Their processing technologies, fibre production technologies.</p> <p>Chemical and physical structure of cellulose, main characteristics of cellulose-based natural and man-made fibres (cotton, flax, hemp, viscose, Lyocell), cellulose as a raw material, its main physical and chemical modification possibilities, natural fibre reinforced composites. Characteristics, molecular structure, crystallinity and orientation of synthetic polymers suitable for fibre formation, pile, phase and physical states of polymers, key structural analysis methods. Mechanism of action and testing possibilities for new types of functional textile products with quality of life-enhancing properties.</p> <p>Characteristics of paper industry fibres. Structural, chemical and surface structure of cellulose fibres, hollow system. Binding energy of fibres. Surface testing by conventional and particle adsorption. The significance of the specific surface area of fibers in paper.</p> <p>Specific methods of materials testing.</p>			
<b>Detailed description of the subject:</b>			
<b>Weeks</b>	<b>Topics of lectures and exercises</b>		
1.	Introduction. Classification and grouping of structural materials, basic concepts of material structure.		
2.	Production technologies of synthetic polymers. Comparison of polymerisation and polycondensation processes.		
3.	The molecular structural level: the special role of carbon, linear and cross-linked structure, branching, stereoregularity. The fine structure level: conditions and factors influencing crystallization, crystalline formations.		
4.	General anisotropic and inhomogeneous mechanical properties of polymers compared to metals. The non-linear stress-strain relationship. Characteristics of deformation components (instantaneous elastic, residual and delayed elastic).		
5.	Dependence of stress-deformation relationship on test speed, temperature and moisture content. Phenomena and mathematical description of creep and stress relaxation.		
6.	Cyclic tests, dynamic characteristics. Durable strength characteristics.		
7.	Polymer behaviour under temperature variation. Set, phase and physical states of polymers. Thermomechanical curves of amorphous and semi-crystalline thermoplastic and cross-linked polymers (duromers and elastomers).		
8.	Moisture absorption, behaviour of polymers under variation of moisture content. Ageing processes, ageing inhibition.		
9.	Knowledge of polymeric materials: 1. General properties of molecular structure, advantages, disadvantages, applications and other of natural and natural based synthetic polymers.		

10.	Knowledge of polymeric materials 2. General properties of synthetic polymers, their molecular structure, advantages, disadvantages, applications.
11.	Characteristics of plastic processing technologies. General characterisation of processing technologies for HL and HNL polymers. Characteristics of each processing technology.
12.	Fibres, filaments and fibrous structures. Primary processing of natural fibres. Production of man-made fibres. Structure and properties of fibrous structures.
13.	Structure of polymer composites. Types, forms of presentation and properties of reinforcing materials. Matrix materials. Manufacturing technologies of composites. Preforms for compression moulding: SMC, BMC. Lamination.
14.	Semester assessment.
<b><i>Mid-semester requirements:</i></b>	
<b>Participation in occupations:</b> Attendance at exercises is compulsory. Attendance at lectures is recommended. The level of absence is regulated by the TVSZ.	
<b>Tests, minutes, reports, etc.:</b> Exercise 1 - minutes Exercise 2 - minutes Exercise 3 - minutes Exercise 4 - minutes Exercise 5 - minutes	
<b>Method of obtaining a signature:</b> To obtain a signature, students must participate in the laboratory exercises, complete the tasks assigned in the laboratory exercises and record the results, submit the reports by the due date, and obtain a minimum satisfactory grade on the reports. The result of the examination is based on 50 % of the marks obtained for the oral part and 50 % of the marks obtained for the laboratory notes, but both must be at least satisfactory.	
<b><i>Professional competencies:</i></b>	
<ul style="list-style-type: none"> <li>- Knowledge of the materials used in product design, their composition, properties, applications, the relationship between material properties and processing.</li> <li>- Ability to formulate a correct judgement or opinion, . to make a decision, to draw conclusions based on the information available</li> <li>- Ability to justify and test decisions on the intended object and to support them with technical and applied scientific research results and methods.</li> </ul>	
<b><i>Bibliography:</i></b>	
<ol style="list-style-type: none"> <li>1. Lewin, M., Pearce, E. M. (Eds.): Handbook of Fiber Chemistry, Third Edition, Marcel Dekker, New York, 2007.</li> <li>2. McIntyre, J. E. (Ed.): Synthetic fibres: nylon, polyester, acrylic, polyolefin, Woodhead Publishing Ltd, Cambridge, 2005.</li> <li>3. <a href="https://elearning.uni-obuda.hu/">https://elearning.uni-obuda.hu/</a> electronic notes and aids prepared by the instructor</li> </ol>	

## ECONOMIC AND HUMAN KNOWLEDGE

<b>Title of the course:</b> <b>Organisational and Management Knowledge</b>	<b>NEPTUN-code:</b> RMXME1EMNF RMXME1EMLF	<b>Weekly teaching hours:</b> <i>l+cw</i> 2+2 10+10	<b>Credit:</b> 4 <b>Requirements:</b> exam
<b>Course leader:</b> Áron Takács Ph.D	<b>Position:</b> honorary associate professor	<b>Required preliminary knowledge:</b> -	
<b>Course Description:</b>			
The aim of the course is to introduce students to management theory and practice, based on the knowledge of management methodology, which are suitable for managing modern business organisations, institutions and non-profit organisations in market conditions. The course will cover the characteristics and operation of project management, crisis management systems based on the principle of objectives, exceptions and project management. Students will learn about modern coaching methods and application techniques.			
<b>Detailed description of the subject:</b>			
<b>Weeks</b>	<b>Topics of lectures and exercises</b>		
1.	Value function-cost optimisation methods		
2.	Organisational and management aspects of supply chains		
3.	Process management, process controlling, process improvement		
4.	Organisation and management policies		
5.	Basic types of economic systems		
6.	Organisational culture and development, organisational behaviour and leadership		
7.	Individual in the organisation		
8.	Defining leadership roles and leadership skills		
9.	Areas of organisational management		
10.	The crisis management process		
11.	Decision making in the organisation		
12.	The concept of a career and the possibilities of a managerial career		
13.	Defining organisational goals, the impact of the environment, measuring organisational performance. Test.		
14.	Business Process Improvement (BPI, BPR, BCP, BCCP) Supplementary test. Evaluation.		
<b>Mid-semester requirements:</b>			
<b>Participation in occupations:</b> Attendance at the exercises is compulsory, the level of absence is regulated by the TVSZ. Attendance at lectures is recommended, subject to the rules laid down in the TVSZ.			
<b>Tests, minutes, reports, etc.</b> Preparation of minutes for each topic, the forms for which are available as a teaching aid in Moodle. Deadline for submission/uploading of minutes: second week after the exercise. Week 13: Test Week 14: Supplementary test. Evaluation.			
<b>The method of obtaining a signature / mid-term mark:</b> Conditions for obtaining a signature: - Valid participation in lectures and tutorials, - assignments submitted/completed in the form of a transcript of the assigned topics, accepted by the tutors,			

<ul style="list-style-type: none"> <li>- 1 online final examination of approximately 60 minutes, with a minimum satisfactory mark, in the form of a written paper. The maximum score for the final examination is 100, of which at least 50 points must be achieved and can be made up once.</li> <li>- Examinations are written and are held online in the Moodle system at the times and for the periods indicated in the Neptun system. The examination mark will be determined on the basis of the marks obtained, with the usual subdivision limits.</li> </ul>
<p><b><i>Professional competencies:</i></b></p>
<ul style="list-style-type: none"> <li>- Possess leadership skills and the knowledge to support successful teamwork.</li> <li>- Possess a wide range of analytical and problem-solving skills and techniques for research and academic work.</li> <li>- Ability to understand, apply and apply knowledge and problem-solving techniques.</li> <li>- Ability to process information, new problems and new phenomena from fields related to the light industry, to understand and solve problems and to come up with original ideas.</li> <li>- Ability to formulate a sound judgement or opinion, to make decisions, to draw conclusions and to give constructive criticism. Érti korának társadalmi eszményeit, életmódját, ezek hatását a megformált termékre.</li> <li>- Knowledge of the tasks and activities related to management, the legislation required for the exercise of the profession.</li> <li>- Ability to design the whole product life cycle in an independent and creative way, taking into account aesthetic, utility, market, environmental, durability, safety, feasibility and ethical aspects, in accordance with the design methodology.</li> <li>- The ability to develop theoretical knowledge independently to solve unconventional problems in the design and construction of complex products and to apply new theory to the practical solution of the problem.</li> <li>- Ability to design new and original products and product-service combinations to meet the needs of the individual customer, based on a balance of interests between designer, user, industry and society, respecting international ethical standards and expectations.</li> <li>- Ability to see the whole innovation and product development process through, and to implement and manage the process either independently or as part of a team or as a leader, often in an international environment.</li> <li>- Ability to explore and interpret the deeper market-customer-production environment context in product design.</li> <li>- Ability to address environmental issues throughout the life cycle of products, and to address sustainability and health-consciousness requirements.</li> <li>- In solving problems, his/her work is characterised by creativity, flexibility and respect for engineering ethics.</li> <li>- He/she will strive to maintain continuous self-learning in product design and related areas, consistent with his/her professional goals.</li> <li>- He/she is committed to progress, to improving the quality of human life, to preserving environmental balance and values, and to sustainability.</li> <li>- Open to innovation.</li> </ul>
<p><b><i>Bibliography:</i></b></p>
<ol style="list-style-type: none"> <li>1. Clayton M. Christensen: "Innovator's Dilemma: When New Technologies Cause Great Firms to Fail" Harvard Business Review Press, 2016. ISBN: 978-1633691780</li> <li>2. Eric Ries: "The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses" Crown Business, 2011. ISBN: 978-0307887894</li> <li>3. John Whitmore: "Coaching for Performance: The Principles and Practice of Coaching and Leadership", Nicholas Brealey Publishing, 2017. ISBN: 978-1473658127</li> </ol>

<b>Title of the course:</b> <b>Applied Ergonomics (blended)</b>	<b>NEPTUN-code:</b> RTEAE1EMNF RTEAE1EMLF	<b>Weekly teaching hours:</b> <i>l+cw</i> 1+1 5+5	<b>Credit: 4</b> <b>Requirements:</b> term mark
<b>Course leader:</b> Gabriella Oroszlány Ph.D	<b>Position:</b> senior lecturer	<b>Required preliminary knowledge:</b> -	
<b>Course Description:</b>			
<p>The aim of the course is to provide students with an ergonomic perspective, the ability to identify and analyse ergonomic problems and the sensitivity to the requirements and expectations of a wide range of user characteristics and needs that arise in different development processes. They will become familiar with the meaning of occupational and consumer ergonomics and the forms of psychological stress that arise during product use. Other important areas are: consumer perspective, taking into account physical and mental parameters. Optimising elements of the physical working environment. Ergonomic experiments, typical cases. Ergonomic assessment and evaluation methods for workplaces.</p>			
<b>Detailed description of the subject:</b>			
<b>Weeks</b>	<b>Topics of lectures and exercises</b>		
1.	Lecture: Topics and requirements for the semester. Review of the knowledge acquired in the basic training (possibly to be acquired). Introduction to ergonomics.		
2.	Lecture: Applied anthropometry.		
3.	L.: Universal Design - Design for All. Accessible product and environment design for all.		
4.	Excercise: UP, ergonomic analysis of products, ergonomic checklist, tools for assessing the working environment.		
5.	E: Anthropometric assessment methods.		
6.	L: Risk assessment in office and industrial workplaces. Ergonomic design of office and industrial work environments.		
7.	L: Information ergonomics, software ergonomics.		
8.	Human-computer interaction, user interface design, interaction design, usability, user experience, product experience and related concepts.		
9.	E: Usability evaluation methods, ergonomic studies.		
10.	E: Accessibility and accessibility testing methods.		
11.	E: Workplace risk assessment.		
12.	Test and mid-term assignment consultation		
13.	Supplementary test and mid-term assignment submission		
14.	Completion of mid-term assignment. Assessment.		
<b>Mid-semester requirements:</b>			
<p><b>Participation in occupations:</b> Attendance at lectures and excercises is compulsory. The number of absences is determined by the Study and Examination Regulations (the number of absences may not exceed 30% of the total number of hours per semester).</p>			
<p><b>Tests, minutes, reports, etc.</b> Week 12: Test Week 13: Extra mid-term exam and submission of mid-term assignment Week 14: Substitution, evaluation</p>			

**The method of obtaining a signature / mid-term mark:**

The requirement for obtaining a mid-year grade:

- Valid participation in the practicals,
- group assignments given during the semester must be completed and handed in by the deadline.
- 1 final examination paper with a grade of at least satisfactory.
- The maximum score for the final examination is 50 points, of which a minimum of 20 points must be achieved. The mid-year assignment will be worth a maximum of 50 points with a minimum of 20 points.
- The mid-year mark is based on the result of the final examination and the mid-year assignment.
- The relevant provisions of the current Study and Examination Regulations apply to the replacement of the mid-term mark.

***Professional competencies:***

- Possesses detailed knowledge and understanding of modern design principles and methods, traditional and special manufacturing technologies, and operational processes.
- Is familiar with the principles and applications of environmental protection, quality management, consumer protection, product liability, equal access, workplace health and safety, technical and economic legal regulations, and the fundamental requirements of engineering ethics.
- Is committed to the culture of health and safety, as well as health promotion.
- Pays particular attention to ensuring the principle of equal access in problem-solving.
- Makes decisions independently and responsibly, consulting with representatives from other fields (primarily legal, economic, energy, environmental protection, architectural, and medical) and assumes responsibility for those decisions.
- When making independent decisions, considers the principles and applications of environmental protection, quality management, consumer protection, product liability, equal access, workplace health and safety, technical, economic, and legal regulations, and ergonomics.

***Bibliography:***

1. Pamela McCauley-Bush: Ergonomics: Foundational Principles, Applications, and Technologies. CRC Press, 2011 ISBN: 978- 1439804459
2. Steven Shorrock, Claire Williams: Human Factors and Ergonomics in Practice: Improving System Performance and Human Well-Being in the Real World. CRC Press 2016. ISBN: 978-1472439251
3. Robert Bridger: Introduction to Human Factors and Ergonomics. CRC Press, 2017. ISBN: 978-1498795944
4. Alvin R. Tilley, Henry Dreyfuss Associates: The Measure of Man and Woman: Human Factors in Design. Wiley publisher, 2001. ISBN: 978-0471099550
5. John D. Lee, Christopher D. Wickens, Yili Liu, Linda Ng Boyle Designing for People: An Introduction to Human Factors Engineering CreateSpace Independent Publishing Platform, 2017. ISBN: 978-1516533986
6. <https://elearning.uni-obuda.hu/> electronic notes and aids prepared by the instructor



<b>Title of the course:</b> <b>Contemporary Design and Innovative Technologies</b>	<b>NEPTUN- code:</b> RTXKD1EMNF RTXKD1EMLF	<b>Weekly teaching hours:</b> <i>l+cw</i> 2+2 10+10	<b>Credit: 5</b> <b>Requirements:</b> term mark
<b>Course leader:</b> Edit Csanák DLA	<b>Position:</b> associate professor	<b>Required preliminary knowledge:</b> -	
<b>Course Description:</b>			
<p>The influence of 20th century design trends at the turn of the 21st century (functionalism, postmodernism).  Economy, society, culture - interacting with design. New materials and technologies.  The synthesis function of design. Global world - global design thinking. Ecological approach to design. Design for the environment. Social design. Design trends. Trend forums.  Trends, creators and their significant works through international and national examples.  Space, structure and functional form models to influence future developments. Materials, technologies and new innovative material-form-function relationships. Processes of subject and environmental design; process models; methodology and rules.  The role of engineering technology then and now. The relationship between form and technology in architecture and environmental design. Similarities and shifts of emphasis. Selected stylistic analyses.  Innovative solutions created by combining techniques and technologies (e.g. textile concrete, etc.).</p>			
<b>Detailed description of the subject::</b>			
<b>Weeks</b>	<b>Topics of lectures and exercises</b>		
1.	Introduction to contemporary design.		
2.	Contemporary Hungarian design I. Trends, artists and their major works.		
3.	Contemporary Hungarian design II.		
4.	International contemporary design I. Trends, artists and their major works.		
5.	International contemporary design II.		
6.	Aspects of industrial design		
7.	Innovative technologies in design I. Material-form-function relationships		
8.	Innovative technologies in design II.		
9.	Innovative technologies in industry I. New solutions combining techniques and technologies		
10.	Innovative technologies in industry II.		
11.	Innovative contemporary design trends of the 21st century I.		
12.	Test, assignment submission.		
13.	Innovative, contemporary design trends of the 21st century II.		
14.	Supplementary test. Assessment.		
<b>Mid-semester requirements:</b>			
<p><b>Participation in occupations:</b>  Attendance at lectures and tutorials is compulsory. The number of absences allowed is determined by the Study and Examination Regulations (the number of absences may not exceed 30% of the total number of hours for the semester). The detailed assignments to be completed during the semester and the specific dates will be published on Moodle.</p>			
<p><b>Tests, minutes, reports, etc.</b>  Week 12. Test  Week 14: Supplementary test and assessment</p>			

**The method of obtaining a signature / mid-term mark:**

To obtain a mid-term grade, the successful completion of the final examination papers and mid-term assignments at the appropriate level (all assignments must be at least satisfactory). A satisfactory final examination grade requires 50% of the maximum score. After the deadline, assignments may only be submitted with a late fee, no later than the week following the deadline. The mid-semester grade will be calculated in the following proportions: test 60%, mid-semester practical assignments 40%. An unsatisfactory mid-term mark may be corrected in accordance with the provisions of the TVSZ.

***Professional competencies:***

- Detailed knowledge and understanding of advanced design principles and methods, traditional and specialised manufacturing processes and operational procedures.
- He/she is committed to progress, improving the quality of human life, preserving environmental balance and values, and sustainability.
- Is committed to ensuring equal access in problem solving.
- Takes into account aspects of the historical, cultural, socio-economic and industrial context in the process of industrial design and product development.
- Knowledge of the materials used in product design, their composition, properties, applications, and the relationship between material properties and processing.
- Ability to design complex, innovative products in terms of form and construction, taking into account the constraints of production technology, expected costs and environmental impact.
- The ability to design the whole product life cycle in an independent and creative way, using design methodology, taking into account aesthetic, utility, market, environmental, durability, safety, feasibility and ethical considerations.
- The ability to develop theoretical knowledge independently to solve unconventional problems in the design and construction of complex products and to apply new theory to the practical solution of the problem.
- An openness to innovation is characteristic.

***Bibliography:***

1. Chris Lefteri: Materials for inspirational design. RotoVision Book, Singapore, 2006.
2. Phaidon Design Classics: New technologies. Phaidon Press Limited, China, 2006
3. Editorial Project: Light Innovations. Loft publications, Barcelona, 2010

## ENGINEERING DESIGN SKILLS

<b>Title of the course:</b> <b>Virtual Product Development I.</b>	<b>NEPTUN- code:</b> RTWVT1EMNF RTWVT1EMLF	<b>Weekly teaching hours:</b> l+cw 0+4 0+20	<b>Credit: 4</b> <b>Requirements:</b> term mark
<b>Course leader:</b> Ákos Borbély Ph.D	<b>Position:</b> associate professor	<b>Required preliminary knowledge:</b> -	
<b>Course Description:</b>			
Modelling of different design processes, from the definition of requirements to prototyping: requirements modelling, concept modelling, sketching, geometric modelling, layout design, detailed product visualisation, animation, and technical documentation. Design, drawing up a conceptual design, technical design, animation, technical drawing, design of the concept, design of the product, design of the technical drawing, technical documentation, design of the product. Mock-up of graphic designs.			
<b>Detailed description of the subject:</b>			
<b>Weeks</b>	<b>Topics of exercises</b>		
1.	Nurbs modelling iteration, import model files, drawings into the interface.		
2.	Basics of SUB-D modelling, creating organic surfaces and models		
3.	Combining SUB-D modelling and Nurbs modelling		
4.	Building 3D models from 2D hand drawings 1.		
5.	Building 3D models from 2D hand drawings 2.		
6.	Basics of photorealistic modelling, historical overview		
7.	Description of lightning objects in model space, application 1.		
8.	Introduction to lightning objects, application 2.		
9.	Introduction to Material Library, application		
10.	Introduction to Texture Mapping, application		
11.	3D printing basics, historical overview		
12.	3D printing development trends, applications		
13.	Test. Submission of an individual assignment.		
14.	Supplementary test. Assessment.		
<b>Mid-semester requirements:</b>			
<b>Participation in occupations:</b> Attendance at the exercises is compulsory, the level of absence is regulated by the TVSZ.			
<b>Tests, minutes, reports, etc.</b> Week 13. Test. Submission of an individual assignment. Week 14: Supplementary test, assessment.			
<b>The method of obtaining a signature / mid-term mark:</b> To obtain a mid-term grade: Completion of class assignments and individual assignment solutions (3) at a minimum satisfactory level. Substitutions according to the TVSZ.			
<b>Professional competencies:</b>			

- Detailed knowledge and understanding of the theory and practice involved in product development and design.
- Knowledge and understanding of computer modelling and simulation tools and methods related to industrial product design engineering.
- Ability to design complex, innovative products in terms of form and construction, taking into account manufacturing technology constraints, expected costs and environmental impacts.
- Ability to design the entire product life cycle in an independent and creative way, using design methodology, taking into account aesthetic, utility, market, environmental, durability, safety, feasibility and ethical considerations.
- The ability to develop theoretical knowledge independently to solve unconventional problems in the design and construction of complex products and to apply new theory to the practical solution of the problem.
- Ability to process information from the knowledge frontiers of professional experience in the discipline, new problems and new phenomena.
- Ability to design new and original products and product-service combinations to meet the needs of the individual customer, on the basis of balanced interests between designer, user, industry and society, respecting international ethical standards and expectations.
- Ability to see the whole innovation and product development process through, and to implement and manage the process either independently or as part of a team or as a leader, often in an international environment.
- Ability to take into account and integrate related technical, human, aesthetic and environmental issues in product development.
- Ability to analyse product functions systematically and to develop them in a cost-effective way.
- Ability to apply tools and methods of computer modelling and simulation related to product design, advanced 3D modelling and manufacturing processes, rapid prototyping systems.
- In solving problems, work is characterised by creativity, flexibility and adherence to engineering ethics.
- He/she will strive to maintain continuous self-learning in product design and related sub-disciplines consistent with his/her professional goals.

***Bibliography:***

1. Self-published user manual for current Adobe programs
2. Mary Ann Fugier- Pascal Golay- Jerry Hambly- Vanessa Steeg: Rhinoceros@modeling tools for designers - Training Manual. Robert McNeel & Associates. 2020.
3. Ron K. C. Cheng: Indide Rhinoceros 5, Cengage Learning Production, USA, Stamford, 2013.
4. Ciro Sannino: Photography & Rendering, GC edizioni, Canada, 2013. ISBN 978-88-88837-28-
5. Learning Rhino 5.0 Training DVD – Tutorial Video, Infinite Skills, Author: Bob Mc Culloch
6. Andre Kutscherauer: 3D Car modelling with Rhinoceros, Urheberrechtlich Geschützes Material, Germani/Munich, 2011. ISBN 978-3-00 034288-2

<b>Title of the course:</b> <b>Virtual Product Development II.</b>	<b>NEPTUN- code:</b> RTWVT2EMNF RTWVT2EMLF	<b>Weekly teaching hours:</b> <i>l+cw</i> 0+4 0+20	<b>Credit: 5</b> <b>Requirements:</b> term mark
<b>Course leader:</b> Ákos Borbély Ph.D	<b>Position:</b> associate professor	<b>Required preliminary knowledge:</b> RTWVT1EMNF, RTWVT1EMLF	
<b>Course Description:</b>			
<p>Modelling of various design processes using 3D engineering programs, from the definition of requirements to prototyping: requirements modelling, concept modelling, sketching, geometric modelling, layout design, detailed photorealistic visualisation and animation of the product, technical documentation. Optimised product development using parametric modelling by rapidly changing product characteristics.</p> <p>Virtual simulation of complete integrated product design, design of integrated product presentation, creation of custom presentation interfaces, creation of custom mockups.</p>			
<b>Detailed description of the subject:</b>			
<b>Weeks</b>	<b>Topics of exercises</b>		
1.	Introduction to parametric modelling 1. Introduction to CAD systems, historical overview.		
2.	Introduction to parametric modelling 2.		
3.	Introduction to the basics of Grasshopper 1		
4.	Introduction to the basics of Grasshopper 2.		
5.	Application of Grasshopper in component modelling 1.		
6.	Application of Grasshopper in component modelling 2.		
7.	Using Grasshopper in component modelling 3.		
8.	Applications of AI (Artificial Intelligence) in product design 1.		
9.	Applications of AI (Artificial Intelligence) in product design 2.		
10.	Photorealistic visualisation of a parametric model 1.		
11.	Photorealistic visualisation of a parametric model 2.		
12.	Preparing a photorealistic visualisation of a parametric model 3.		
13.	Test. Submission of an individual problem solution.		
14.	Supplementary test. Assessment.		
<b>Mid-semester requirements:</b>			
<b>Participation in occupations:</b> Attendance at the exercises is compulsory, the level of absence is regulated by the TVSZ.			
<b>Tests, minutes, reports, etc.</b> Week 13. Test. Submission of an individual assignment. Week 14: Supplementary test, assessment.			
<b>The method of obtaining a signature / mid-term mark:</b> To obtain a mid-term grade: Completion of class assignments and individual assignment solutions (3) at a minimum satisfactory level. Substitution according to the TVSZ.			
<b>Professional competencies:</b>			

- Detailed knowledge and understanding of the theory and practice involved in product development and design.
- Knowledge and understanding of computer modelling and simulation tools and methods related to industrial product design engineering.
- Ability to design complex, innovative products in terms of form and construction, taking into account manufacturing technology constraints, expected costs and environmental impacts.
- Ability to design the entire product life cycle in an independent and creative way, using design methodology, taking into account aesthetic, utility, market, environmental, durability, safety, feasibility and ethical considerations.
- The ability to develop theoretical knowledge independently to solve unconventional problems in the design and construction of complex products and to apply new theory to the practical solution of the problem.
- Ability to process information from the knowledge frontiers of professional experience in the discipline, new problems and new phenomena.
- Ability to design new and original products and product-service combinations to meet the needs of the individual customer, based on a balance of interests between designer, user, industry and society, respecting international ethical standards and expectations.
- Ability to see the whole innovation and product development process through, and to implement and manage the process either independently or as part of a team or as a leader, often in an international environment.
- Ability to take into account and integrate related technical, human, aesthetic and environmental issues in product development.
- Ability to systematically analyse product functions and develop them cost-effectively.
- Ability to apply tools and methods of computer modelling and simulation related to the product design discipline, advanced 3D modelling and manufacturing processes, rapid prototyping systems.
- In solving problems, work is characterised by creativity, flexibility and adherence to engineering ethics.
- He/she will strive to maintain continuous self-learning in product design and related sub-disciplines consistent with his/her professional goals.
- Ability to design new and original products and product-service combinations to meet the needs of the individual customer, on the basis of balanced interests between designer, user, industry and society, respecting international ethical standards and expectations.

***Bibliography:***

1. Self-published user manual for current Adobe programs
2. Mary Ann Fugier- Pascal Golay- Jerry Hambly- Vanessa Steeg: Rhinoceros@modeling tools for designers - Training Manual. Robert McNeel & Associates. 2020.
3. Ron K. C. Cheng: Indide Rhinoceros 5, Cengage Learning Production, USA, Stamford, 2013.
4. Ciro Sannino: Photography & Rendering, GC edizioni, Canada, 2013. ISBN 978-88-88837-28-4
5. Learning Rhino 5.0 Training DVD – Tutorial Video, Infinite Skills,  
Author: Bob Mc Culloch
6. Andre Kutscherauer: 3D Car modelling with Rhinoceros, Urheberrechtlich Geschützes Material, Germani/Munich, 2011. ISBN 978-3-00 034288-2

<b>Title of the course:</b> <b>Integrated Product Design Project I.</b>	<b>NEPTUN-code:</b> RTWIT1EMNF RTWIT1EMLF	<b>Weekly teaching hours:</b> <i>l+cw</i> 0+3 0+15	<b>Credit:</b> 4 <b>Requirements:</b> term mark
<b>Course leader:</b> Prof. Márta Kisfaludy DLA	<b>Position:</b> professor	<b>Required preliminary knowledge:</b> -	
<b>Course Description:</b>			
<p>The aim of integrated product design based on social, economic, ecological and professional aspects is to present the product and its relationship system in a coherent and harmonised way. The general objective of the course is to systematise the theoretical and practical knowledge necessary for the practice of product design engineering and to develop the skills of product design. Understanding of human aesthetic, cultural and social processes beyond the technical and economic aspects of scientific research. Meeting the expectations of our material and environmental culture.</p> <p>To develop students' professional design skills through industrial design and image design exercises.</p>			
<b>Detailed description of the subject:</b>			
<b>Weeks</b>	<b>Topics of exercises</b>		
1.	Discussion of the mid-term assignment, clarification of a topic/proposal that responds to the current problem/trend. Identify groups and their terms of reference.		
2.	Collection of references on relevant objects/tools in use. Min. 5 positive and 5 negative examples. Product design principles.		
3.	Survey and analysis, ergonomic principles. Form and function.		
4.	Structuring research, brainstorming. Keywords related to the image to be created (min. 10-10 per team). List of requirements.		
5.	Environment and spatial presentation of the utility object/item/collection. Moodboard and colourboard.		
6.	Image, branding, typography. Discussing directions, brainstorming together, individual concept sketches.		
7.	Choice of colours and materials.		
8.	Start-up plan, marketing analysis, target group definition.		
9.	Presentation of final ideas and materials.		
10.	Design selection, documentation, cost plan and instructions for use.		
11.	Model making, visuals, poster I.		
12.	Model creation, visuals, poster II.		
13.	Presentations		
14.	Replacements. Evaluation.		
<b>Mid-semester requirements:</b>			
<b>Participation in occupations:</b> Attendance at the exercises is compulsory, the level of absence is regulated by the TVSZ.			
<b>Tests, minutes, reports, etc.</b> Week 5: Moodboard and colourboard Week 10: Documentation Week 13: Presentation and poster Week 14: Substitutions, evaluation.			



**The method of obtaining a signature / mid-term mark:**

The mid-year grade is based on the average of the evaluation of the submissions and the presentation. The final grade will be calculated as 50% satisfactory, 65% average, 80% good, 90-100% excellent. The relevant rules of the TVSZ apply to make-ups.

***Professional competencies:***

- Detailed knowledge and understanding of the theory and practice involved in product development and design.
- Detailed knowledge and understanding of advanced design principles and methods, traditional and specialised manufacturing processes and operational procedures.
- Knowledge of management tasks and activities and the legislation required for the exercise of the profession.
- Knowledge of the basic requirements of environmental protection, quality, consumer protection, product liability, the principle and application of equal access, health and safety at work, technical and economic legislation and engineering ethics.
- Ability to design complex, innovative products in terms of form and construction, taking into account manufacturing technology constraints, expected costs and environmental impact.
- Ability to design the whole product life cycle in an independent and creative way, using design methodology, taking into account aesthetic, utility, market, environmental, durability, safety, feasibility and ethical considerations.
- The ability to develop theoretical knowledge independently to solve unconventional problems in the design and construction of complex products and to apply new theory to the practical solution of the problem.
- The ability to think analytically, synthesise knowledge and solve problems creatively based on a broad professional knowledge base.
- The ability to formulate a sound judgement or opinion, make decisions and draw conclusions on the basis of the information available.
- Ability to perform leadership roles in companies and research organisations, including administrative roles.
- Ability to design new and original products and product-service combinations to meet the needs of the individual customer, on the basis of balanced interests between designer, user, industry and society, respecting international ethical standards and expectations.
- Ability to see the whole innovation and product development process through, and to implement and manage the process either independently or as part of a team or as a leader, often in an international environment.
- Ability to take into account and integrate related technical, human, aesthetic and environmental issues in product development.
- Ability to manage teamwork through a broad professional background and problem-solving skills.
- Ability to set new goals and define the steps to achieve them, initiate, set up and implement complex projects in a team environment, especially in a multidisciplinary environment.
- In solving problems, he/she will be creative, flexible and have a strong sense of engineering ethics.
- Strives to maintain self-development in product design and related disciplines on an ongoing basis and in line with his/her professional goals.
- Independently selects and applies relevant problem-solving methods when solving market, customer and quality problems.
- In problem solving, pays particular attention to ensuring equal access to the principle of equal opportunities.
- Decisions are taken independently, in consultation with other disciplines (in particular legal, economic, energy, environmental, architectural, medical), for which he takes responsibility.
- In independent decision-making, it takes into account the environment, quality, consumer

protection, product liability, the principle and application of equal access, health and safety at work, technical, economic and legal regulation, ergonomics and psychology, as well as engineering ethics.

***Bibliography:***

1. Dalcacio Reis, Julius Weidemann: Product Design in the Sustainable era. Köln, Taschen GmbH, 2010.
2. <https://elearning.uni-obuda.hu/> electronic notes and aids prepared by the instructor
3. Jane Penty: Product Design and Sustainability. Routledge, 2019. ISBN 9781351400848
4. Bjarki Hallgrímsson: Prototyping and Modelmaking for Product Design : Second Edition. Laurence King Publishing, London, United Kingdom, 2019. ISBN13 9781786275110
5. Rob Thompson: Manufacturing Processes for Design Professionals. Thames & Hudson Ltd., London, United Kingdom, 2007. ISBN13 9780500513750

<b>Title of the course:</b> <b>Integrated Product Design Project II.</b>		<b>NEPTUN-code:</b> RTWTT2EMNF RTWTT2EMLF	<b>Weekly teaching hours:</b> <i>l+cw</i> 0+4 0+20	<b>Credit: 4</b> <b>Requirements:</b> term mark
<b>Course leader:</b> Prof. Márta Kisfaludy DLA		<b>Position:</b> professor	<b>Required preliminary knowledge:</b> RTWIT1EMNF, RTWIT1EMLF	
<b>Course Description:</b>				
<p>The aim of integrated product design based on social, economic, ecological and professional aspects is to present the product and its relationship system in a coherent and harmonised way. In solving design problems, exploring the social, industrial, cultural and economic context of design by studying the overall system of form and environment design. (Personal design, social design) To learn about the human being, the object and its environment, the relationship between external and internal spaces, visual information systems, tools and interactive communication possibilities and the technologies used. Aspects used in the design process: form-function unity, aesthetics, usability, economy, feasibility, safety. Form perception, emotional and semantic identification of form.</p>				
<b>Detailed description of the subject:</b>				
<b>Weeks</b>	<b>Topics of exercises</b>			
1.	Discussion of the mid-term assignment, clarification of a current topic/application. Identify groups and tasks.			
2.	Collection of references on relevant community spaces/cultural spaces. Min. 5 positive and 5 negative examples. Personal and social design principles.			
3.	Survey and analysis: characteristics, functions and attributes of the building and its environment.			
4.	Call words related to the image to be created (min. 10-10 per team). List of requirements			
5.	Research structuring, brainstorming.			
6.	Discuss branding, moodboard and directions, brainstorming together, individual sketch plans.			
7.	Colour selection and identity design.			
8.	Discussing structural experiments, defining the main pillars of the Identity Book, finalising the name of the cultural space.			
9.	Presentation of final ideas and matrices.			
10.	Design selection, documentation and cost plan.			
11.	Model creation, visuals, poster I.			
12.	Design of models, visuals, poster II.			
13.	Presentations			
14.	Replacements. Evaluation.			
<b>Mid-semester requirements:</b>				
<b>Participation in occupations:</b> Attendance at the exercises is compulsory, the level of absence is regulated by the TVSZ.				
<b>Tests, minutes, reports, etc.</b> Week 6: Moodboard and hand-made structures Week 9: Identity book Week 13: Presentation and poster Week 14: Replacements. Evaluation.				

***Professional competencies:***

- Detailed knowledge and understanding of the theory and practice involved in product development and design.
- Detailed knowledge and understanding of advanced design principles and methods, traditional and specialised manufacturing processes and operational procedures.
- Knowledge of management tasks and activities and the legislation required for the exercise of the profession.
- Knowledge of the basic requirements of environmental protection, quality, consumer protection, product liability, the principle and application of equal access, health and safety at work, technical and economic legislation and engineering ethics.
- Ability to design complex, innovative products in terms of form and construction, taking into account manufacturing technology constraints, expected costs and environmental impact.
- Ability to design the whole product life cycle in an independent and creative way, taking into account aesthetic, utility, market, environmental, durability, safety, feasibility and ethical aspects, using design methodology.
- The ability to independently develop theoretical knowledge and apply new theory to solve unconventional problems in the design and construction of complex products.
- The ability to think analytically, synthesise knowledge and solve problems creatively, based on a broad professional knowledge base.
- The ability to formulate a sound judgement or opinion, make decisions and draw conclusions on the basis of the information available.
- Ability to perform leadership roles in companies and research organisations, including administrative roles.
- Ability to design new and original products and product-service combinations to meet the needs of the individual customer, based on a balance of interests between designer, user, industry and society, respecting international ethical standards and expectations.
- Ability to see the whole innovation and product development process through, and to implement and manage the process either independently or as part of a team or as a leader, often in an international environment.
- Ability to take into account and integrate related technical, human, aesthetic and environmental issues in product development.
- Ability to lead team work through a broad professional background and problem-solving skills.
- Ability to set new objectives and define the steps to achieve them, to initiate, set up and implement complex projects in a team environment, in particular in a multidisciplinary context.
- The ability to work with creativity, flexibility and respect for engineering ethics.
- He/she will strive for continuous self-learning in product design and related disciplines, in line with his/her professional goals.
- Independently selects and applies relevant problem-solving methods to solve market, customer and quality problems.
- In problem solving, he/she will pay particular attention to ensuring equal access.
- Decisions are taken independently and in consultation with other disciplines (in particular law, economics, energy, environment, architecture, medicine), for which he/she takes responsibility.
- In its autonomous decision-making, it takes into account the basic standards of environmental protection, quality, consumer protection, product responsibility, the principle and application of equal access, health and safety at work, technical, economic and legal regulation, ergonomics and psychology, and engineering ethics.

***Bibliography:***

1. Dalcacio Reis, Julius Weidemann: Product Design in the Sustainable era. Köln, Taschen GmbH, 2010.
2. Jane Penty: Product Design and Sustainability. Routledge, 2019. ISBN 9781351400848
3. Bjarki Hallgrímsson: Prototyping and Modelmaking for Product Design : Second Edition. Laurence King Publishing, London, United Kingdom, 2019. ISBN13 9781786275110
4. Rob Thompson: Manufacturing Processes for Design Professionals. Thames & Hudson Ltd., London, United Kingdom, 2007. ISBN13 9780500513750
5. <https://elearning.uni-obuda.hu/> electronic notes and aids prepared by the instructor

<b>Title of the course:</b> <b>Integrated Product Design Project III.</b>		<b>NEPTUN- code:</b> RTWTT3EMNF RTWTT3EMLF	<b>Weekly teaching hours:</b> <i>l+cw</i> 0+4 0+20	<b>Credit: 5</b> <b>Requirements:</b> term mark
<b>Course leader:</b> Prof. Márta Kisfaludy DLA		<b>Position:</b> professor	<b>Required preliminary knowledge:</b> RTWTT2EMNF, RTWTT2EMLF	
<b>Course Description:</b>				
<p>The aim of integrated product design based on social, economic, ecological and professional aspects is to present the product and its relationship system in a coherent and harmonised way. Analysis, conceptualisation and solution of a problem-specific research and development project proposal (eco-design, art design). Preparation of project task documentation and product model. Functional form models, space, structure, designed visual models, new material-form and function relationships. Experimental eco-design aesthetic models: modelling of form, space and meaning experiments with an inherently ecological approach. 3D and real space modelling.</p>				
<b>Detailed description of the subject:</b>				
<b>Weeks</b>	<b>Topics of exercises</b>			
1.	Discussing the semester's assignment, clarifying a theme/application to support a current arts/ heritage programme. Identify groups and tasks.			
2.	Collection of references on relevant programmes/subjects (min. 5 positive and 5 negative examples). Eco-design and art design principles.			
3.	Analysis of inspirations, drawing conclusions.			
4.	Research structuring, brainstorming. Calling words for the image to be created (min. 10-10 per team). List of requirements.			
5.	Stylistic elements of the object collection/space organisation. Moodboard and colourboard.			
6.	Choice of colours and materials.			
7.	Image, branding, typography. Discussing directions, brainstorming together, individual concept sketches.			
8.	Target group definition.			
9.	Presentation of final ideas and materials.			
10.	Design selection, documentation, budget.			
11.	Preparation of architectural model/object model, visual plans, poster I.			
12.	Preparation of architectural model/object model, visual designs, poster II.			
13.	Presentations			
14.	Substitutions. Evaluation.			
<b>Mid-semester requirements:</b>				
<b>Participation in occupations:</b> Attendance at the exercises is compulsory, the level of absence is regulated by the TVSZ.				
<b>Tests, minutes, reports, etc.</b> Week 6: Moodboard and colourboard Week 10: Documentation Week 13: Presentation and poster Week 14: Substitutions, evaluation.				
<b>Professional competencies:</b>				

- Detailed knowledge and understanding of the theory and practice involved in product development and design.
- Detailed knowledge and understanding of advanced design principles and methods, traditional and specialised manufacturing processes and operational procedures.
- Knowledge of management tasks and activities and the legislation required for the exercise of the profession.
- Knowledge of the basic requirements of environmental protection, quality, consumer protection, product liability, the principle and application of equal access, health and safety at work, technical and economic legislation and engineering ethics.
- Ability to design complex, innovative products in terms of form and construction, taking into account manufacturing technology constraints, expected costs and environmental impact.
- Ability to design the whole product life cycle in an independent and creative way, taking into account aesthetic, utility, market, environmental, durability, safety, feasibility and ethical aspects, using design methodology.
- The ability to develop theoretical knowledge independently to solve unconventional problems in the design and construction of complex products and to apply new theory to the practical solution of the problem.
- The ability to think analytically, synthesise knowledge and solve problems creatively, based on a broad professional knowledge base.
- Ability to formulate a sound judgement or opinion on the basis of the information available, to make a decision
- Ability to take on leadership roles in companies and research organisations, including administrative roles.
- Ability to design new and original products and product-service combinations to meet the needs of individual customers, based on a balance of interests between designer, user, industry and society, respecting international ethical standards and expectations.
- Ability to see the whole innovation and product development process through, and to implement and manage the process either independently or as part of a team or as a leader, often in an international environment.
- Ability to take into account and integrate related technical, human, aesthetic and environmental issues in product development.
- Ability to manage teamwork through a broad professional background and problem-solving skills.
- Ability to set new objectives and define the steps to achieve them, to initiate, set up and implement complex projects in a team environment, in particular in a multidisciplinary context.
- The ability to work with creativity, flexibility and respect for engineering ethics.
- He/she will strive for continuous self-learning in product design and related disciplines, in line with his/her professional goals.
- Independently select and apply relevant problem-solving methods when solving market, customer and quality problems.
- In problem solving, he/she pays particular attention to ensuring equal access to the principle of equal opportunities.
- Decisions are taken independently and in consultation with other disciplines (in particular law, economics, energy, environment, architecture, medicine), for which he/she takes responsibility.
- In its independent decisions, it takes account of the principles and application of environmental protection, quality, consumer protection, product liability, equal access, health and safety at work, technical, economic and legal regulation, ergonomics and psychology, and engineering ethics.

#### ***Bibliography:***

1. Dalcacio Reis, Julius Weidemann: Product Design in the Sustainable era. Köln, Taschen GmbH, 2010.
2. Bjarki Hallgrímsson: Prototyping and Modelmaking for Product Design : Second Edition. Laurence King Publishing, London, United Kingdom, 2019. ISBN13 9781786275110
3. Rob Thompson: Manufacturing Processes for Design Professionals. Thames & Hudson Ltd., London, United Kingdom, 2007. ISBN13 9780500513750
4. Jane Penty: Product Design and Sustainability. Routledge, 2019. ISBN 9781351400848
5. <https://elearning.uni-obuda.hu/> electronic notes and aids prepared by the instructor

## DESIGN KNOWLEDGE



<b>Title of the course:</b> <b>Design and Visual Identity</b>	<b>NEPTUN- code:</b> RTWFA1EMNF RTWFA1EMLF	<b>Weekly teaching hours:</b> l+cw 2+2 10+10	<b>Credit: 5</b> <b>Requirements:</b> term mark
<b>Course leader:</b> Prof. Márta Kisfaludy DLA	<b>Position:</b> professor	<b>Required preliminary knowledge:</b> -	
<b>Course Description:</b>			
<p>The aim of the subject is to systematise and deepen the knowledge acquired previously in the field of visual communication, and to solve design tasks based on this knowledge. Symbols, associations. Expression and perception. Formative and constructional elements, use of materials and colours, technological possibilities, aesthetic specifications. Visual system design, presentation of basic information elements on the product. Design manual. Development and documentation of product design for a given product range.</p> <p>Systematic application of the different graphic genres. Company logo, building management system, software user interface, publication series and families, exhibition installations, systems. Image and image. The personality of the company - Corporate Identity, a factor that helps to sell the product. Company character, business philosophy - the value that can be expressed in the product. Brand image. Image elements, visual information. Product image. Relationship between business strategy and design tools.</p> <p>Building on previous studies, complex design of spatial elements, objects and lighting for a specific external or internal architectural environment.</p>			
<b>Detailed description of the subject:</b>			
<b>Weeks</b>	<b>Topics of lectures and exercises</b>		
1.	Introduction, description of the semester. Adobe Illustrator settings.		
2.	Introduction to the software used during the semester. Using Adobe Illustrator		
3.	Introduction to logo design, word pictures. Word Graphic Design		
4.	Visual system design, display of basic information elements on the product. Logo design, monogram logo		
5.	Logo design text logo		
6.	Logo design pictorial logo		
7.	Test. Logo design, "camouflage" design		
8.	Pictograms and aspects of their design. Symbols, associations.		
9.	Editing the portfolio, content and visual elements. Portfolio creation 1		
10.	Summary and infographics Portfolio creation 2.		
11.	Design manual. Design elements, visual information. Product image. Image design 1.		
12.	Parts of the small image, the extensive image Image design 2.		
13.	Test. Image design 3. Mockup creation.		
14.	Supplementary test. Presentation of the designs made during the semester, substitutions.		
<b>Mid-semester requirements:</b>			

<p><b>Participation in occupations:</b> Attendance at the exercises and the lectures is compulsory, the level of absence is regulated by the TVSZ.</p>
<p><b>Tests, minutes, reports, etc.</b> Weeks 7 and 14: Tests with at least a satisfactory grade in the theoretical material. Week 14: Individual development and electronic submission of mid-semester assignments via Moodle.</p>
<p><b>The method of obtaining a signature / mid-term mark:</b> To receive a mid-semester grade, the final examination and the assignments must be completed at least satisfactorily. The grade will be based on the results of the theoretical material (tests) and the practical assignments.</p>
<p><b><i>Professional competencies:</i></b></p>
<ul style="list-style-type: none"> <li>- Knowledge of the materials used in product design, their composition, properties, applications and the relationship between material properties and processing.</li> <li>- Detailed knowledge and understanding of modern design principles and methods, traditional and specialised manufacturing processes and operational procedures.</li> <li>- Understands the social ideals and lifestyles of his/her time and their impact on the product formed.</li> <li>- Ability to design complex, innovative products in terms of form and construction, considering the constraints of production technology, expected costs and environmental impact.</li> <li>- Ability to design the whole product life cycle in an independent and creative way, using design methodology, taking into account aesthetic, utility, market, environmental, durability, safety, feasibility and ethical considerations.</li> <li>- The ability to develop theoretical knowledge independently to solve unconventional problems in the design and construction of complex products and to apply new theory to the practical solution of the problem.</li> <li>- Ability to take on leadership roles in companies and research organisations, including administrative roles.</li> <li>- Ability to work in an international environment through social and cultural sensitivity and language and communication skills.</li> <li>- Ability to design new and original products and product-service combinations to meet the needs of the individual customer, based on a balance of interests between designer, user, industry and society, respecting international ethical standards and expectations.</li> <li>- In solving problems, his work is characterised by creativity, flexibility and respect for the rules of engineering ethics.</li> <li>- He/she will strive to ensure that his/her self-learning in product design and related disciplines is continuous and consistent with his/her professional goals.</li> <li>- He/she will take great care to ensure equal access to the principle of equal opportunity in problem solving.</li> </ul>
<p><b><i>Bibliography:</i></b></p>
<ol style="list-style-type: none"> <li>1. The Pepin Press-Agile Rabbit edition: Signs&amp;Symbols. The Pepin Press, Amsterdam, 2003.</li> <li>2. J. Robert Rossman , Mathew D. Duerden: Designing Experiences. Columbia University Press, New York, United States, 2019. ISBN13 9780231191685</li> <li>3. William Lidwell , Kristina Holden , Jill Butler: Universal Principles of Design : 125 Ways to Enhance Usability, Influence Perception, Increase Appeal, Make Better Design Decisions, and Teach through Design. Rockport Publishers Inc. Rockport, United States, 2010. ISBN13 9781592535873</li> <li>4. Donald A. Norman: The Design of Everyday Things. Basic Books, New York, United States, 2013. ISBN13 9780465050659</li> <li>5. Alina Wheeler: "Designing Brand Identity: An Essential Guide for the Whole Branding Team". Wiley, 2017. ISBN: 978-1118980828</li> <li>6. David Airey: "Logo Design Love: A Guide to Creating Iconic Brand Identities".</li> <li>7. Marty Neumeier: "Brand Gap: How to Bridge the Distance Between Business Strategy and Design". New Riders, 2005. ISBN: 978-0321348104.</li> </ol>

<b>Title of the course:</b> <b>Typography</b>		<b>NEPTUN- code:</b> RTWTI1EMNF RTWTI1EMLF	<b>Weekly teaching hours:</b> <i>l+cw</i> 1+2 5+10	<b>Credit:</b> 4 <b>Requirements:</b> term mark
<b>Course leader:</b> Csanák Edit DLA		<b>Position:</b> associate professor	<b>Required preliminary knowledge:</b> -	
<b>Course Description:</b>				
<p>Clear, precise and effective typography is a prerequisite for effective visual communication. The aim of the course is to deepen students' knowledge of typography, to develop their typographic design skills and to familiarise them with the rules of typography, with an emphasis on the practical application of these rules.</p> <p>The basics of calligraphy. The relationship between variations in form, text and typefaces.</p>				
<b>Detailed description of the subject:</b>				
<b>Weeks</b>	<b>Topics of lectures and exercises</b>			
1.	Introduction, Adobe Indesign settings			
2.	History of letters, the evolution of writing Master pages, setting up a new document - creating a business card			
3.	Font history, the evolution of fonts Inserting and using images, drawing tools - flyer design 1.			
4.	History of fonts, history of fonts from the Renaissance Flyer design 2.			
5.	Anatomy of letters 1. Poster design - letter poster			
6.	Anatomy of letters 2. Poster design - figural poster with text			
7.	Text editing 1. margins, typesetting Introduction to word spacing, spacing styles - poem			
8.	Spinning 2. spinning - book, newspaper Spinning with styles - drama text			
9.	Using the modular grid, designing a newspaper. Designing a daily newspaper			
10.	Magazine design 1. Page pair design			
11.	Magazine design 2. with cover			
12.	Book structure, designing a title page Book cover design			
13.	Book structure, index, table of contents design Title block design			
14.	Test. Presentation of designs made during the semester, additions.			
<b>Mid-semester requirements:</b>				
<b>Participation in occupations:</b> Attendance at the exercises and the lectures is compulsory, the level of absence is regulated by the TVSZ.				
<b>Tests, minutes, reports, etc.</b> Weeks 7 and 14: two final examination papers with at least satisfactory marks Week 14: Individual development and electronic submission of mid-term assignments via Moodle.				

**The method of obtaining a signature / mid-term mark:**

To receive a mid-semester grade, the final examination and the assignments must be completed at least satisfactorily. The grade will be based on the results of the theoretical material (Tests) and the practical assignments.

***Professional competencies:***

- He/she understands the social ideals and lifestyle of his time, and their impact on the product he creates.
- Ability to design the whole life cycle of a product in an independent and creative way, taking into account aesthetic, utilitarian, market, etc., environmental, durability, safety, feasibility and ethical aspects.
- The ability to develop theoretical knowledge independently to solve unconventional problems in the design and construction of complex products and to apply new theory to the practical solution of the problem.
- Ability to work in an international environment through social and cultural sensitivity and language and communication skills.
- Ability to design new and original products and product-service combinations to meet the needs of the individual customer, based on a balance of interests between designer, user, industry and society, respecting international ethical standards and expectations.
- In solving problems, his work is characterised by creativity, flexibility and respect for the rules of engineering ethics.
- He/she will strive to ensure that his/her self-learning in product design and related disciplines is continuous and consistent with his/her professional goals.

***Bibliography:***

1. Ellen Lupton: "Thinking with Type: A Critical Guide for Designers, Writers, Editors, & Students".Princeton Architectural Press,2014. ISBN: 978-1568989693
2. Robert Bringhurst: "The Elements of Typographic Style". Hartley & Marks Publishers,2012. ISBN: 978-0881792126
3. Rob Carter, Ben Day, Philip Meggs: "Typographic Design: Form and Communication". Wiley, 2014 ISBN: 978-1118715765.

<b>Title of the course:</b> <b>Construction and Technology Skills</b>	<b>NEPTUN- code:</b> RTWKT1EMNF RTWKT1EMLF	<b>Weekly teaching hours:</b> <i>l+cw</i> 1+2 5+10	<b>Credit: 4</b> <b>Requirements:</b> term mark
<b>Course leader:</b> Edit Csanák DLA	<b>Position:</b> associate professor	<b>Required preliminary knowledge:</b> RTWVT1EMNF, RTWVT1EMLF-	
<b>Course Description:</b>			
<p>The relationship between materials and shaping, typical constructions of different materials. Ergonomic design solutions in the context of the use of micro- and macro-environmental objects. Modelling, editing, 3D simulations.</p> <p>Durability, elasticity, strength and mechanical tests of the construction. Surface, transparency, perception, touch. Design of solid and mobile structures.</p>			
<b>Detailed description of the subject:</b>			
<b>Weeks</b>	<b>Topics of lectures and exercises</b>		
1.	Introduction, assignment		
2.	Basic concepts, consultation		
3.	Classical and contemporary technologies, consultation		
4.	Technological trends 2023, precedent research		
5.	Interpretation of assignments, brainstorming		
6.	Task I. brainstorming, experimental modelling, testing.		
7.	Handing in task I., documentation preparation, evaluation.		
8.	Task II. brainstorming, experimental modelling, testing.		
9.	Hand in task II., prepare documentation, evaluation.		
10.	Task III., gathering inspiration, sketching		
11.	Development of solution variations, ideas.		
12.	Modelling from mock-up, load tests, documentation.		
13.	Presentation of the mid-term assignments and submission of documentation for the 3 assignments.		
14.	Substitutions. Assessment.		
<b>Mid-semester requirements:</b>			
<b>Participation in occupations:</b> Attendance at the exercises is compulsory, the level of absence is regulated by the TVSZ. Attendance at lectures is recommended, subject to the rules laid down in the TVSZ.			
<b>Tests, minutes, reports, etc.</b> Week 13: Presentation of mid-term assignments, submission of documentation Week 14: Substitutions, evaluation			
<b>The method of obtaining a signature / mid-term mark:</b> The mid-term grade is calculated by summing up the evaluation of the presentation and the documentation. The final grade will be 50% satisfactory, 65% average, 80% good, 90-100% excellent. The relevant rules of the TVSZ apply for making up the grade.			
<b>Professional competencies:</b>			

- Knowledge of the materials used in product design and their composition,
- their properties, applications, the relationship between material properties and processing.
- Detailed knowledge and understanding of modern design principles and methods, traditional and specialised manufacturing processes and operational procedures.
- Ability to design complex, innovative products in terms of form and construction, taking into account the constraints of manufacturing technology, expected costs and environmental impact.
- Ability to design the entire product life cycle in an independent, creative way, taking into account aesthetic, utility, market,
- environmental, durability, safety, feasibility and ethical aspects.
- The ability to develop theoretical knowledge independently to solve unconventional problems in the design and construction of complex products and to apply new theory to the practical solution of the problem.
- Ability to design new and original products and product-service combinations to meet the needs of the individual customer, based on a balance of interests between designer, user, industry and society, respecting international ethical standards and expectations.
- Ability to apply the rules for the preparation of product documentation.

***Bibliography:***

1. Chris Lefteri: Materials for inspirational design. RotoVision Book, Singapore, 2006.
2. Phaidon Design Classics: New technologies. Phaidon Press Limited, China, 2006
3. Editorial Project: Light Innovations. Loft publications, Barcelona, 2010
4. Dalcacio Reis, Julius Weidemann: Product Design in the Sustainable era. Köln, Taschen GmbH, 2010.
5. <https://elearning.uni-obuda.hu/> PPT-s and aids prepared by the instructor

## OPTIONAL KNOWLEDGE

<b>Title of the course:</b> <b>Professional Foreign Language</b>	<b>NEPTUN- code:</b> RTWSI1EMNF RTWSI1EMLF	<b>Weekly teaching hours:</b> l+cw 0+2 0+10	<b>Credit: 4</b> <b>Requirements:</b> term mark
<b>Course leader:</b> Ákos Borbély Ph.D	<b>Position:</b> associate professor	<b>Required preliminary knowledge:</b> General language exam level B2 (intermediate)	
<b>Course Description:</b>			
<p>During the language exercises, students will become acquainted with the selected professional vocabulary of product and image design and its use, considering the specific circumstances of use, such as context-dependent variations in meaning, by processing written texts and audio materials in foreign languages. In addition to textual work, special attention will be paid to the grammatical features and related grammatical phenomena (especially dative structures, dependent speech, adjectives, adverbs and adverbial phrases) which affect the structure and content of professional texts.</p> <p>Descriptions of technological operations and work processes in foreign languages.</p> <p>Learning to understand and deal with communication situations in the economy and in the profit-oriented operation of businesses and companies, as well as in the context of individual interests (with customers and business partners).</p>			
<b>Detailed description of the subject:</b>			
<b>Weeks</b>	<b>Topics of exercises</b>		
1.	Introduction, basic concepts.		
2.	Innovation and design		
3.	From product idea to implementation		
4.	From product idea to implementation		
5.	Materials and technologies 1.		
6.	Materials and technologies 2.		
7.	Materials and technologies 3.		
8.	Research methodology		
9.	Brand management 1.		
10.	Brand management 2.		
11.	World of work		
12.	World of work		
13.	Seminary test		
14.	Supplementary seminary test. Evaluation.		
<b>Mid-semester requirements:</b>			
<b>Participation in occupations:</b> Attendance at the exercises is compulsory, the level of absence is regulated by the TVSZ.			
<b>Tests, minutes, reports, etc.</b> Week 13: Test Week 14: Supplementary Test, assessment			
<b>The method of obtaining a signature / mid-term mark:</b> The mid-semester grade is calculated by summing up the activity in class and the result of the examination.			



***Professional competencies:***

- The ability to work in an international environment, thanks to social and cultural sensitivity and language and communication skills.
- Ability to design new and original products and product-service combinations to meet the needs of the individual customer, based on a balance of interests between designer, user, industry and society, respecting international ethical standards and expectations.
- Ability to see the whole innovation and product development process through, and to implement and manage the process either independently or as part of a team or as a leader, often in an international environment.
- Ability to set new objectives and define the steps to achieve them, initiate, assemble and execute complex projects in a team environment, especially in a multidisciplinary context.
- He/she takes into account the historical, cultural, socio-economic and industrial context aspects in the process of industrial design and product development.

***Bibliography:***

1. Texts, articles, soloists selected and compiled by the teacher
2. Relevant extracts from Internet texts, articles, books, audio and/or video material
3. TED.com

<b>Title of the course:</b> <b>Product Safety</b>	<b>NEPTUN- code:</b> RMXTB1EMNF RMXTB1EMLF	<b>Weekly teaching hours:</b> <i>l+cw</i> 2+0 10+0	<b>Credit:</b> 4 <b>Requirements:</b> exam
<b>Course leader:</b> Tibor Gregász Ph.D	<b>Position:</b> associate professor	<b>Required preliminary knowledge:</b> -	
<b>Course Description:</b>			
<p>The aim of the course is to familiarise students with the basic principles of the legal regulations on the safety of products and the aspects to be regarded in the case of different product areas. They will also be familiar with the procedures that accompany the production, distribution, and use of products to ensure their safety and reliability.</p> <ul style="list-style-type: none"> <li>- The link between safety and product stewardship</li> <li>- The old, new and global approach to EU directives on product conformity</li> <li>- The legislative background to product liability</li> <li>- CE marking and other conformity marks and symbols. Product liability issues related to food</li> <li>- Technical requirements for electrical and electronic products</li> <li>- Safety of machinery and equipment</li> <li>- Safety of children's furniture and toys</li> <li>- Safety of medical devices</li> <li>- Requirements for personal protective equipment</li> <li>- Product certification modules for obtaining CE</li> <li>- System of bodies and testing institutes for product conformity</li> <li>- Reports of accredited-designated-notified bodies</li> <li>- System of alerts on dangerous products (RAPEX, TRAPEX, RASFF, ...) in the EU.</li> </ul>			
<b>Detailed description of the subject:</b>			
<b>Weeks</b>	<b>Topics of lectures</b>		
1.	Analysis of the usability and safety of the product as function design		
2.	The development and legal environment of product safety		
3.	The task and tools of consumer protection, consumer rights, the requirements of the Consumer Protection Act determining product safety.		
4.	EU directives for product safety. The old, new and global approach EU directives for product conformity.		
5.	Logic of product certification modules to obtain CE.		
6.	Meanings of the CE marking and other conformity markings and signs. The process of obtaining the certificate.		
7.	System of bodies and testing institutes in relation to product conformity.		
8.	Report of accredited-designated-notified organizations		
9.	System of alerts due to dangerous products (RAPEX, TRAPEX, RASFF) Safety of furniture and toys.		
10.	Safety of machines and equipment		
11.	Product liability issues related to safe foods.		
12.	Technical requirements related to electrical and electronic products		
13.	Test. Delivery of the complex report.		
14.	Supplementary Test.		
<b>Mid-semester requirements:</b>			
<b>Participation in occupations:</b> Attendance at the lectures is compulsory; the TVSZ regulates the level of absence.			

**Tests, minutes, reports, etc.**

Week 13: Writing a valid Test online. Delivery of the complex report.

Week 14: Supplementary Test.

**The method of obtaining a signature / mid-term mark:**

*The condition for obtaining a signature is:*

- valid participation in lectures,
- task(s) submitted/uploaded in the form of minutes from the designated topics, accepted by the practice supervisors,
- 1 piece approx. Writing a 60-minute, online closed paper graded with a minimum passing grade.
- The maximum indoor score is 100, of which at least 50 points must be achieved and can be made up once.

*The condition for obtaining an exam ticket:*

Test takes place online in the Moodle system at the times and durations posted in the Neptun system. The formation of the exam mark based on the points achieved with the usual proportion limits.

***Professional competencies:***

- Knows, applies and complies with technical and economic legal regulations and the principles of engineering ethics.
- He/she knows the global social and economic processes related to his/her professional field.
- Able to understand laws and relationships, use problem-solving techniques, apply the acquired knowledge and make practical use of it.
- Capable of formulating appropriate criticism or opinion, making decisions, drawing conclusions, and formulating constructive criticism.
- During his work and communication, his attitude is typically problem-recognizing and solving.
- He makes his decisions carefully, independently, in consultation with representatives of other (primarily legal, economic, energetic, environmental protection, architectural, medical) fields, for which he assumes responsibility.
- Knows and understands the modern design principles and technical requirements that must be considered when designing a safe product for a specific target area.
- Able to apply safety standards in the design of safe products by understanding their technical background and adapting them to the plans.
- Understands and can integrate consumer protection, product liability, technical standards, and legal regulations in the field of product safety.
- Able to independently develop theoretical knowledge and apply new theories to solve safety problems in the design and construction of complex products.

***Bibliography:***

1. Lucas Bergkamp: "The European Union REACH Regulation for Chemicals: Law and Practice". Oxford University Press, 2013. ISBN: 978-0199659791
2. Geraint Howells, Mark Mildred: "Product Safety and Liability Law in Europe: Regulatory Frameworks and Recent Developments". Edward Elgar Publishing, 2016. ISBN: 978-1783470408
3. Dave Lohbeck: "CE Marking Handbook" Butterworth-Heinemann, 2016. ISBN: 978-0128036833
4. <https://elearning.uni-obuda.hu/> electronic notes and aids prepared by the instructor

<b>Title of the course:</b> <b>History of Graphic Design</b>	<b>NEPTUN-code:</b> RTWGT1EMNF RTWGT1EMLF	<b>Weekly teaching hours:</b> <i>l+cw</i> 2+0 10+0	<b>Credit:</b> 4 <b>Requirements:</b> term mark
<b>Course leader:</b> Daniella Koós DLA	<b>Position:</b> associate professor	<b>Required preliminary knowledge:</b> -	
<b>Course Description:</b>			
<p>The course aims to present the most outstanding creators and works of the graphic arts, the technical changes of each era, the informative and image-historical aspects of image reproduction (popular prints, caricatures).  Avant-garde graphics in Europe and Hungary. Trends between the two world wars and after 1945 in Europe and in Hungary. Andy Warhol and pop art.  The history of poster art. Significant works, institutions and workshops of contemporary European and Hungarian graphics.  Journals, exhibitions. New technical experiments.</p>			
<b>Detailed description of the subject:</b>			
<b>Weeks</b>	<b>Topics of lectures</b>		
1.	Introduction		
2.	Classical graphic techniques		
3.	Arts and Crafts		
4.	Art Nouveau		
5.	Bauhaus, geometric abstraction		
6.	Art Deco		
7.	Test 1.		
8.	The graphic history of the 50s.		
9.	The graphic history of the 60s.		
10.	The graphic history of the 70s.		
11.	The graphic history of the 80s.		
12.	The graphic history of the 90s.		
13.	The 2000s, digital graphics.		
14.	Test 2.		
<b>Mid-semester requirements:</b>			
<b>Participation in occupations:</b> Attendance at the lectures is compulsory, the level of absence is regulated by the TVSZ.			
<b>Tests, minutes, reports, etc.</b> Weeks 7 and 14: Tests with at least a sufficient grade from the theoretical material.			
<b>The method of obtaining a signature / mid-term mark:</b> In order to obtain the mid-semester pass, it is necessary to complete the tests at a sufficient level. The grade is based on the results of the Tests.			
<b>Professional competencies:</b>			
<ul style="list-style-type: none"> <li>- He/she understands the social ideals of her time, her lifestyle, and their impact on the created product.</li> <li>- Able to explore and interpret the deeper connections of the market-customer-production-environment during the product design process.</li> <li>- Takes 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. Dictionary of Graphic Design and Deigners, Thames&Hudson, London, 1992
2. Timothy Samara: Grafikai tervezés kézikönyve, Sclar kiadó, Budapest, 2016
3. John Foster: New Masters of Poster Design. Rockport Publishers, 2008.

<b>Title of the course:</b> <b>History of Interior Design</b>	<b>NEPTUN-code:</b> RTWET1EMNF RTWET1EMLF	<b>Weekly teaching hours:</b> l+cw 2+0 10+0	<b>Credit:</b> 4 <b>Requirements:</b> term mark
<b>Course leader:</b> Daniella Koós DLA	<b>Position:</b> associate professor	<b>Required preliminary knowledge:</b> -	
<b>Course Description:</b>			
<p>Knowledge of the history of style. Society, economy and culture as factors influencing lifestyle. Periods and styles in applied art.  Living spaces from antiquity to the 20th century. Modernism and Functionalism. 20th century interiors.  Interior styles. Contemporary trends and designers.  Changes in material use at different ages.</p>			
<b>Detailed description of the subject:</b>			
<b>Weeks</b>	<b>Topics of lectures</b>		
1.	Description of semester topics and assignments.		
2.	The relationship between society and the interior in different historical periods I.		
3.	The relationship between society and the interior in different historical periods II.		
4.	Knowledge of the history of style. Society, economy and culture as key factors influencing lifestyle. Different living spaces from antiquity to the 20th century 1.		
5.	Knowledge of the history of style. Society, economy and culture as factors influencing lifestyle. Different living spaces from antiquity to the 20th century 2.		
6.	Interior designers in the world of tourism and hospitality.		
7.	Interiors that match the characteristics of professional tourism (business, conferences, professional exhibitions and their accompanying events, sightseeing, wellness, cultural programs).		
8.	The interiors of the characteristics of leisure tourism (related to sports, nature walks, sports events, cruises, holiday tourism, the guest stays in one place or region).		
9.	Interiors according to the characteristics of health tourism, spa sightseeing, cultural facilities, religious tourism related to cultural events, etc.).		
10.	Workplace interiors 1. Design of offices in buildings of different styles		
11.	Workplace interiors 2. (health facility, school, premises/buildings of production units that meet various requirements).		
12.	Presentation of semester analytical work		
13.	Presentation of semester analytical work		
14.	Submission of an analysis task. Evaluation.		
<b>Mid-semester requirements:</b>			
<b>Participation in occupations:</b> Attendance at the lectures is compulsory, the level of absence is regulated by the TVSZ.			
<b>Tests, minutes, reports, etc.</b> Week 14: Submission of analysis task, evaluation			
<b>The method of obtaining a signature/mid-semester grade:</b> The condition for obtaining the mid-semester pass is active participation in classes and completing the semester analysis task at an acceptable (minimum sufficient) level. The applicable regulations of the Study and Examination Regulations apply to the replacement of the mid-semester mark.			
<b>Professional competencies:</b>			

- He/she understands the social ideals and lifestyle of his time, and their impact on the product he creates.
- Takes account of the historical, cultural, socio-economic and industrial context in the process of industrial design and product development.

***Bibliography:***

1. <https://elearning.uni-obuda.hu/> electronic notes and aids prepared by the instructor
2. Kate Fletcher: Sustainable fashion and Textile Design Journeys, Taylor & Francis, 2014. ISBN10 0415644569, ISBN13 9780415644563
3. Michael Braungart: Cradle to Cradle. Vintage Publishing, 2018. ISBN13 (EAN): 9781784873653
4. Stephanie Travis: Sketching for Architecture and Interior Design. Laurence King Publishing, 2015. ISBN-13: 978-1780675923