Óbuda University
Rejtő Sándor Light Industry and Environmental Engineering

TRAINING PROGRAMM
WITH DETAILED SUBJECTS

Industrial Design Engineering BSc (F)

01 September 2023

BASIC SUBJECTS

Title of the course: Fundamentals of Natural Sciences	**NEPTUN-code:** RKXTA1EBNF	**Weekly teaching hours:** l+cw+lw 1+3+0	**Credit:** 5 **Exam type**: term mark
Course leader: Csaba Ágoston Ph.D.	**Position:** senior lecturer	**Required preliminary knowledge:** -	

Curriculum:

The primary aim of the course is to develop students' scientific literacy, critical thinking and problem-solving skills. In addition to learning about natural laws, systems and processes, emphasis is placed on developing students' ecological perspectives. The practical tasks and projects are based primarily on the knowledge acquired in secondary school, thus enabling the knowledge acquired to be assessed and providing a basis for learning the subjects at university. In addition to basic knowledge of physics, biology, geography, chemistry and environmental protection, the course will provide a synthesis of knowledge focusing on the interrelationship of environmental elements that will help to solve engineering problems and develop environmentally aware behaviour. The integration of complex knowledge is realised in the understanding of the basic interrelationships between natural systems and is applied in project work and integrated into the students' thinking and actions.

Detailed schedule of the course:

Weeks	**Topics of lectures and practice**
1.	Concept of science, different between science and pseudoscience. Subfield of sciences. description of project tasks (1., 2., 3.)
2.	Fundamental of physics. Description of movements, reference systems. Velocity and acceleration. Newton's laws. Force laws and equation of motion. Energy, work, energy conservation. Conservation of angular momentum. Presented through practical examples.
3.	Fundamentals of mechanics of point systems. Field of gravity force. Dynamics of periodic movements. Description of movements in accelerating coordinate system. Presented through practical examples.
4.	Mechanics of inflexible objects. Elastic deformation. Structure of solid object. Presented through practical examples. 1. Project presentations.
5.	Mechanics of fluids. Molecular forces in liquids. Flow of fluids. Waves. Presented through practical examples.
6.	Mechanical waves, sound. Propagation and speed of light. Reflection and refraction of light. Optical tubes. Fundamental of optic. Interference and diffraction. Optical grid. Presented through practical examples.
7.	History and topics of chemistry. Chemistry in other scientific fields, its importance in environmental protection.
8.	The role of chemistry in subfields of environmental protection. 2. Project presentations.
9.	History and topics of biology. Biology in other scientific fields, its importance in environmental protection.
10.	The role of biology in subfields of environmental protection.
11.	History and topics of geography. Geography in other scientific fields, its importance in environmental protection. 3. Project presentations.
12.	The role of geography in subfields of environmental protection.

13.	Written test.
14.	Replacement (supplementary) written test.

Mid-semester requirements:

Attendance at lectures:

It is compulsory to attend the lectures. The rules of education and exam directory (TVSZ) are the guidelines.

Exams and tests (types, data)

1.	1. project task 20 points
2.	2. project task 20 points
3.	3. project task 20 points
4.	Written test 40 points

Requirements for qualification:

Total points: 100 (20+20+20+40). Term marks: 86-100%: excellent (5), 71-85%: good (4), 56-70%: average (3), 41-55%: pass (2), 0-40%: fail (1)
If the student has not met the requirements of obtaining the term mark (e.g. has not written or failed the in-class test, has not submitted the measurement report, etc.), he/she must be given one opportunity to make up for the term mark in the study period.

Professional competencies:

- Open and receptive to the application of new, modern and innovative organic farming practices and methods.
- In his/her work, he/she strives to act in a law-abiding manner and to respect engineering ethics.
- Ability to acquire new knowledge through the empirical solution of practical problems.
- Ability to translate solutions developed in nature into technical practice.
- Ability to participate in and lead teamwork.
- Understand and authentically represent the role of the environment in society and its fundamental relationship with the world.

Literature:

1. Townsend, C.R., Begon, M., Harper, J.L. (2006). Essentials of Ecology (2nd Edition). Blackwell Publishing.
2. Darrell Ebbing, Steven D. Gammon: General Chemistry, Cengage Learning, 2015, Cengage Learning, Boston, ISBN-13: 978-1305580343; ISBN-10: 1305580346
3. Serway Jewett: Physics for Scientist and Engineers
4. William M. Marsh, Martin M. Kaufman: Physical geography, Cambridge University Press, 2013.
5. Michael Allaby (2000): Basics of Environmental Science, Routledge, New York, ISBN 0415-21175-1

Title of the course: **Mathematics I.**	**NEPTUN-code:** RKXMA1EBNF	**Weekly teaching hours:** l+cw+lw 2+2+0	**Credit:** 6 **Exam type**: exam
Course leader: Aurél Galántai, Dr.Prof.	**Position:** professor	**Required preliminary knowledge:** -	

Curriculum:

The main goal of the course is to introduce the set theory marks and to describe the algebraic and geometric properties of the real number line, complex numerical plane and the three-dimensional space. Additionally, with the help of the concepts of sequences, real functions and convergence to construct univariate differential and integral computing in a way which makes the students capable of solving any technical / mathematical / physical problems that arise in subsequent studies.

Detailed schedule of the course:

Week	**Topics of Lectures**
1.	Sets. Natural numbers. Integers. Rationals, real numbers, upper limit. Roots, powers.
2.	Trigonometric functions. Complex numbers, algebraic, trigonometric and exponential form. Taking *n*th roots. Polynomials, rational expressions.
3.	Three-dimensional vectors. Vector algebra, vector geometry. Matrices. transpose matrix. Three-dimensional determinants.
4.	Real functions. Operations with functions. Polynomial and power functions. Trigonometric and arc functions. Exponential and logarithmic functions. Sketching graphs of functions.
5.	Convergence of real sequences. Monotonic and bounded sequences. Density points.Limit calculation methods. Celebrated sequences. The Eulerian number. Powers of irrational exponents. Limits of type 1^{∞}.
6.	Limits and continuity of real functions. The concept of differentiation. Equations of tangent and normal lines. The rules of differentiation.
7.	Solution Test #1 type problems.
8.	Elementary functions and their derivatives. Mean value theorems of differential calculus. Monotonity of differentiable functions. L′Hôpital's rule.
9.	Calculus of extrema. Higher order derivatives. Convexity and inflection. Discussion of real functions.
10.	The concept of definite integral, its geometrical meaning and basic properties. Primitive functions, indefinite integral.
11	Newton–Leibniz formula. Fundamental integrals. Integration by parts and by substitution.
12	Arc-length, area. Revolution surfaces and bodies. Improper integrals. Nujerical integration. Conversation into partial fractions. Integration of rational functions.
13	Solution of Test #2 type problem.
14	Supplementary Test.

Practical work:

Week	**Topics of Practices**
1.	Common denominators. Roots and powers. Quadratic equations. Polynomial division.
2.	Radian, trigonometric functions. Complex operations in algebraic and trigonometric form.
3.	Solving complex equations.
4.	Equations of lines and planes. Fitting space elements, distances and angles between them.

5.	Matrix operations, transposition. Thre-dimensional determinants. Real functions.
6.	Limit of real sequences.
7.	ZH1+Derivatives, equations of the tangent and normal lines.
8.	L'Hôpital's rule.
9.	Calculus of extrema. Integration by parts. Integration by substitution.
10.	Convexity and inflection.
11	Basic integrals. Integration by parts.
12	Definite integral and applications.
13	ZH2+Integration by substitution.
14	Solution of problems for the exam.

Mid-semester requirements:

Attendance at lectures:

The rules of education and exam directory (TVSZ) are the guidelines.

Exams and tests (types, data)

written	Test #1 (week #7),
written	Test #2 (week #13): both for max. 30 pts.

Requirements for qualification:

Signature can be obtained if the sum of the two tests is greater than or equal to 30 pts.
In the opposite case a supplementary test from the material of the two tests on week #14, and (if required) one more possibility on the 2nd week exam session, with similar percents.

Type of exam (written, oral, tests etc.) and the method of assessment:

Written exam from the material of the whole semester for max. 26 pts.
Marking:
22-26: excellent (5)
18-21: good (4)
14-17: satisfactory (3)
10-13: pass (2)
0 - 9: fail (1)

Professional competencies:

- Knowledge of general and specific mathematical, natural and social scientific principles, rules, relations, and procedures as required to pursue activities in the special field of environment protection.
- In possession of state-of-the-art IT skills, being able to use professional databases and certain design, modelling, and simulation software depending on their specialty.
- Able to participate creatively in engineering work based on their multidisciplinary skills, as well as to adapt to continuously changing circumstances.
- Open to professional cooperation with specialists related to their profession but involved in other areas.

Literature:

1. Thomas – Weir – Hass: Thomas' Calculus, 13e, Pearson, 2013.
2. Anton – Bivens – Davis: Calculus, 10e, Wiley, 2012.
3. Anton – Rorres: Elementary Linear Algebra, 11e, Wiley, 2013.
4. Gilbert Strang: Differential Equations and Linear Algebra, Cambridge University Press, ISBN 9780980232790, 2015

Title of the course: **Mathematics II.**	**NEPTUN code:** RKXMA2EBNF	**Weekly teaching hours:** l+cw+lw 2+2+0	**Credit:** 6 **Exam type:** exam
Course leader: Aurél Galántai Dr.Prof.	**Position:** professor	**Required preliminary knowledge:** RKXMA1EBNF sign	

Curriculum:

Introduction of complex numbers. The most important types of ordinary differential equations and construction of their solutions. Basic concepts of linear algebra. Vector geometry of the 3-dimensional Euclidean space. Convergence in n-dimensional Euclidean spaces. Differential calculus of functions in several variables. Geometrical problems connected to smooth curves and surfaces. Basic concepts of mathematical statistics. Construction of the line of linear regression.

Detailed schedule of the course:

Week	**Topics of lectures**:
1.	Systems of linearequations. Gauss--Jordan elimination. Rank of a matrix.
2.	First order differential equations. General and particular solutions. Separable differential equations. First-order linear differential equations.
3.	Second-order linear differential equations with constant coefficients. Damped and harmonic oscillations.
4.	Open, closed and bounded sets of euclidean spaces. Convergence of point sequences. Limits and continuity of multivariate functions. The *n*-dimensional space. Multivariate functions (scalarfields), vectorfields. Partial derivatives, gradient. The chain rule in several variables. Partial derivatives of order 2, Young theorem, Smooth curves, velocity field. Derivativein a direction. Total differentiability. Smooth surfaces, tangent plane, normal line.
5.	Solution of Problems of Test 1
6.	Test 1
7.	Hesse-determinant. Extrema of functions of two variables. Areal and volume integral, calculation of volumes.
8.	Line and surface integrals. Jacobi matrix. Divergence, curl. Vector field without sources and whirls. Scalar and vector potential. Stokes-type theorems.
9.	Event algebras, probability fields. Geometrical probability. Conditional probability. The full probability theorem. Sampling with replacement and without replacement.
10.	Random variables of discrete and continuous distributions. Expectations, standard deviations..
11.	Binomial and hypergeometrical distributions, sampling. Exponential and normal distributions.
12.	Statistical samples. Sample average, empirical deviations. The equation of the regression line.
13.	Test 2.
14.	Retake for signature

Week	**Practical work description**
1.	Solvability of linear systems by elimination.
2.	Initial problems for Separable Differential Equations and First Order Linear equations.
3.	Initial problems for 2nd-order linear equations with constant coefficients.

4.	Partial derivatives, derivatives in a given direction. Tangent plane and Normal line.
5.	Preparation for Test 1(Solution of Problems)
6.	Extrema of function of two variables.
7.	Area integral.
8.	Divergence, curl. Line integral, potential function.
9.	Line integral, potential function.
10.	Sampling with and without replacement.
11.	Basic properties of cumulative distribution function and probability densities.
12.	Preparation of Test 2(Solution of Problems)
13.	Sample average, empirical deviation, linear correlation coefficient. Regression line. Retake Exercises.
14.	Retake and Exam Exercises.

Mid-semester requirements:

Attendance at lectures:

The rules of education and exam directory (TVSZ) are the guidelines.

Exams and tests (types, data)

Test #1 (week #6),
Test #2(week #13).

Requirements for qualification:

Signature can be obtained if the sum of the points obtained in the two test is at least 40 % of the total of points.
In the opposite case a supplementary test from the material of the two tests on week #14, and (if required) one more possibility at the beginning of the exam session, with similar percents.

Type of exam (written, oral, tests etc.) and the method of assessment:

Written exam from the material of the whole semester for max. 26 pts.
Marking:
22-26: excellent (5)
18-21: good (4)
14-17: satisfactory (3)
10-13: pass (2)
0 - 9: fail (1)

Professional competencies:

- Knowledge of general and specific mathematical, natural and social scientific principles, rules, relations, and procedures as required to pursue activities in the special field of environment protection.
- In possession of state-of-the-art IT skills, being able to use professional databases and certain design, modelling, and simulation softwares depending on their specialty.
- Able to participate creatively in engineering work based on their multidisciplinary skills, as well as to adapt to continuously changing circumstances.
- Open to professional cooperation with specialists related to their profession but involved in other areas.

Literature:

1. Anton, H., Rorres, C.: Elementary Linear Algebra with Applications, 9e, Wiley, 2005, ISBN: 0-471-66959-8.
2. Thomas, G.B. et al.: Thomas' Calculus, 11e, Addison-Wesley, 2005, ISBN: 0-321-18558-7.
3. Gilbert Strang: Linear Algebra for Everyone, Wellesley Cambridge Press, ISBN 9781733146630, 2020
4. Douglas C. Montgomery-Elizabeth -A Peck, G. Geoffrey Vining: Introduction to Linear Regression Analysis, Yohn Wiley & Sons, INC. ISBN 0 471 31565 6, 2001

Title of the course: **Knowledge of sustainability, environmental ethics**	**NEPTUN-code:** RKWFK1EBNF	**Weekly teaching hours:** l+cw+lw 2+0+0	**Credit:** 4 **Exam type**: exam
Course leader: Rita Kendrovics-Boda, Ph.D.	**Position:** associate professor	**Required preliminary knowledge:** -	

Curriculum:

The educational aim of the subject is to integrate environmental awareness into everyday activities and to show opportunities and methods for sustainability. To identify opportunities to consciously shape needs according to environmental expectations. Optimal use of available resources. Developing individual and community environmental awareness and orienting others towards environmental awareness. Students will learn about the principles of sustainability, and the semester assignments will help them to acquire the key competences of sustainability education. An important part of the course is to familiarise students with the environmental dependency of humans and human societies, the environmental, economic, and social problems that result from our environmental dependency and the ways to address them. The course addresses the moral problems of right human action towards living beings/nature within the disciplinary boundaries of bioethics. It introduces the economic, social, ethical, and ecological problems of globalisation; it describes the different theoretical orientations of ecophilosophy and eco-ethics (anthropocentric, pathocentric, biocentric and ecocentric ethics). It describes the basic principles of environmental ethics.

Detailed schedule of the course:

Week	**Topics of lectures and practical works**
1.	The concept and main principles of sustainable development. UN Sustainable Development Goals (SDGs)
2.	Environmental indicators for sustainable development.
3.	Indicators of "well-being" - indicators of environmental quality.
4.	Energy consumption. Energy sources and their finiteness.
5.	Dilemmas of economic growth. The impact of innovation on our environment.
6.	Basics of circular economy.
7.	Domestic examples of circular economy. Case study.
8.	Engineering for sustainable development. - Eco-design.
9.	ESG is the sustainable business indicator. Case study.
10.	Smart cities. Case studies.
11.	Concept and trends in environmental ethics.
12.	Science and technology as an ethical problem.
13.	Ecopsychology - the links between environmental awareness, well-being and the natural environment.
14.	Summary, final test, end of semester

Mid-semester requirements:

Attendence:

Attendance at the lectures is compulsory. Project work must be prepared in groups, submitted in writing and presented orally.

Test papers, measurement records, reports, etc. (number, date):

1.	Project work 1: Putting sustainable development into practice. Case study 15 points

2.	Project work 2: Applying sustainable development in engineering practice. Case study 15 points
3.	Project work 3: Science and technology as an ethical problem (essay max. 5 pages) 15 points
4.	Final test 55 points

Methods of qualification:

Attendance at lectures (according to the Education and Examination Regulations - TVSZ) and written and oral completion of case studies and essay group work are required for signature.

Examination: written exam maximum of 55 points, plus a maximum of 45 points for case studies completed during the semester. Total points achievable 100 points. Examination grading: 0-40 fail; 41-55 pass; 56-70 satisfactory; 71-85 good; 86-100 excellent.

If total points of the final test at the end of the semester plus the marks obtained in the case studies are min. 71, a proposed mark of examination may be obtained (good and excellent).

Professional competencies:

- Knowledge of learning, knowledge acquisition and data collection methods, their ethical limitations and problem-solving techniques in the environmental field.
- Comprehensive knowledge of the basic characteristics and interrelationships of environmental elements and systems and the pollutants that affect them.
- Knowledge of the properties of environmental elements and their interactions.
- Ability to apply a holistic approach to environmental tasks environmental issues.
- Demonstrates responsible behaviour towards the environment.
- Multidisciplinary knowledge enables them to participate creatively in engineering work and to adapt to constantly changing requirements.

Literature:

1. Thompson Allen: The Oxford Handbook of Environmental Ethics, Oxford University Press Inc, 2019, ISBN: 9780190933388
2. Mackenzie Davis: Principles of Environmental Engineering & Science, McGraw-Hill Education, 2019, ISBN: 9781260548020
3. Emma Hutchinson - Sari Kovats: Environment, Health and Sustainable Development, Open University Press, 2017, ISBN:9780335245376
4. M.H. Fulekar - Bhawana Pathak - R K Kale: Environment and Sustainable Development, Springer Nature, 2014, ISBN: 978-8132211655

Name of subject: **Chemistry**	**NEPTUN-code:** RMXKE1EBNF	**Number of hours:** lec+gs+lab 1+0+1	**Credit:** 4 **Requirements:** exam
Course coordinator: Tamás Csiszér Ph.D.	**Title:** associate professor	**Prerequisite:** -	

Curriculum:

The aim of the subject is to provide essential basic knowledge about the structure, properties and transformations of chemical substances. The subject covers the properties and reactions of substances, from the formation of individual atomic and molecular structures, through chemical bonds and interactions, to the characterisation of homogeneous and heterogeneous sets. It also introduces students to the classification, preparation and main applications of elements and inorganic compounds. In the exercises, students will also practise solving the main computational problems in inorganic chemistry (writing and solving reaction equations based on oxidation numbers, calculating the concentration of solutions, converting concentration units, gas laws). The subject covers the grouping and chemistry of dyes for product design.

Detailed schedule of the course:

Educational week	**Topics of lectures and practices**
1.	Classification of chemical substances. Chemical symbol and formula. Periodic table of the elements. Nomenclature of inorganic compounds (acid, base, salt). Accident prevention. Use of laboratory equipment. Measurement of mass and volume.
2.	Theory ZH 1 (periodic table, chemical symbol, formula, SI units) Law of conservation of mass and energy. Electromagnetic radiation, light, spectra. Formulae of important ions and compounds.
3.	Structure of the atom, formation of electron shells. Formation of ions, electronegativity. Molecular orbitals and spatial shape of molecules, polarity. Types of solutions, conversion of concentration units.
4.	Types of chemical bonds. Covalent, ionic and metallic bonding. Secondary chemical bonds, stacking. Types of homogeneous single component systems. States of matter I: characterisation of plasma and gas. Solubility, concentration calculation relationships.
5.	Characteristics of liquids and solids. Solution preparation, density measurement.
6.	Interpretation of a three-point diagram. Multicomponent systems. Preparation and separation of gas, liquid, solid mixtures. Precipitation, precipitation, decantation, filtration.
7.	Laws of dilute solutions (reduction of tensiometry, boiling point rise, freezing point depression, osmosis, reverse osmosis).
8.	Chemical equilibria, equilibrium constant, law of mass action. Stoichiometry.
9.	Concepts and calculation of pH. Characterisation of acids, bases, salts (acid-base theories). Electrolyte solutions, electrolyte dissociation. Acid-base titration.
10.	Theory ZH 2 (material for 2-9 hours). Types of chemical reactions. Types of chemical reaction equations, ordering by oxidation numbers.
11.	Basic concepts of organic chemistry. grouping of organic compounds. Structure and properties of open and closed chain saturated and unsaturated hydrocarbons, important representatives.
12.	Grouping, structure and properties of halogenated, oxygenated, nitrogenated, sulphurated and siliconized organic compounds, their main representatives. Structural formulae of organic compounds.
13.	Classification and chemistry of dyes. Test (ZH)
14.	Supplementary Tests.

Mid-term requirements:

Attendance at lectures and practices/labs:

Attendance at the exercises is compulsory, absence according to the TVSZ. Attendance at lectures is also compulsory, for the successful completion of the semester (exam) knowledge of the material presented in the lectures is required.

Tests, minutes, reports, etc.:

Weeks 2 and 10: Theory Test (ZH 1) (80% accepted) Theory ZH 2 (51% accepted)
Week 13: Practice ZH (51% accepted).
Week 5, 6, 9: Preparation and submission of a report on the material from the exercises in weeks 5, 6, 9.

Method of obtaining a signature/mid-term mark:

Signature requirement:
- Completion of the exercises,
- Preparation of the minutes and submission in the laboratory exercise following completion,
- a minimum of a final paper on the material from the exercises. 51%,
- 1 min. 51% of the final grade, 51% of the final grade, 51% of the final grade, and 1 min. 80%, ZH 2 min. 51%.

A student who does not have a signature at the end of the semester may attempt to obtain a signature (in case of failure in the ZH) once in the first two weeks of the examination period. The signature requirement is the same as during the mid-year. The written examination and the final mark will be based on the results of the written tests and the work submitted to obtain the signature.

Professional competencies:

- Knowledge of general and specific mathematical, natural and social scientific principles, rules, relations, and procedures as required to pursue activities. Comprehensive knowledge of the basic features and interrelations of environmental elements and system. Knowledge of the main methods to examine the quantity and quality features, their typical measuring instruments and limitations thereof, as well as methods for the evaluation of data measured.
- The subject performs basic tests of the quantity and quality characteristics and systems by state-of-the-art measuring instruments; to draw up and implement measurement plans; and to evaluate data.
- Chemistry solves tasks of water, soil, air, radiation, and noise protection, as well as of waste treatment and processing at proposal level; to participate in preparing decisions; to perform authority audits; and to take part in the operation of these technologies.
- The subject is able to reveal deficiencies in the technologies applied and process risks and to initiate mitigation measures after getting familiarized with the technology concerned.

Bibliography

1. N. Akhmetov: General and Inorganic Chemistry, MIR Publishers, Moscow, 1983
2. A. Pahari, B. Chauhan: Engineering Chemistry, Infinity Science Press LLC, Hinghan, Massachusetts, New Delhi, India, 2007

Title of the course: **Physics for Engineers**	**NEPTUN-code:** RKXFI1ABNF	**Weekly teaching hours:** l+cw+lw 2+2+0	**Credit:** 4 **Exam type**: exam
Course leader: Sándor Pekker, Dr.	**Position:** research professor	**Required preliminary knowledge:** -	

Curriculum:

The following topics will be covered in the course: the propagation and speed of light. Fundamentals of physical optics. Interference and diffraction phenomena. Principles of light scattering. Optical fibres. Lens exchange systems, imaging errors. Imaging of optical devices. Temperature. Thermal expansion of solids, liquids and gases. Basic thermodynamic concepts. Principles of thermodynamics. Fundamentals of statistical physics. Phase transitions. Irreversible thermodynamic processes. Electrostatics. Current conduction, direct currents. Basic magnetic phenomena. The magnetic field. Forces in magnetic field. Magnetic properties of materials. Law of excitation. Mechanisms of conduction. Electromagnetic induction. Electromagnetic waves. Theory of relativity. Thermal radiation. The photoelectric phenomenon. Photons. Fundamentals of quantum mechanics. Basics of quantum electronics, lasers. Basic properties of nuclei, models of nuclei.
The following topics are presented in the Fundamentals of Science subject: Newtonian mechanics, such as Description of motions, reference frame. Newton's laws. Laws of force and the equation of motion. The work theorem. Periodic motion. The law of angular momentum. The gravitational force field. Description of motions in an accelerating coordinate system. Basics of mechanics of point systems. Plane motion of a rigid body. Spinning motion. Elastic deformations. Mechanics of quiescent liquids and gases. Molecular forces in fluids. Flow of liquids. Wave theory.

Detailed schedule of the course:

Training week	**Topics of lectures and practices**
1.	Sound waves. Speed of sound. Sound propagation. Sound levels. Doppler effect and sonic boom in sound (air).
2.	Determination of speed of sound and SPL (in dB). Solution of thermodynamics problems. Linear and volume expansion. Use of ideal gas law. Application of first law of thermodynamics.
3.	Thermodynamics. Absolute temperature scale. Thermal expansion of solids and liquids. Phase change. Heat and latent heat. State equation of ideal gases. Internal energy, work done by gas. First law of thermodynamics. Special processes.
4.	Problem solving for heat propagation, and heat engines.
5.	Heat propagation. Thermal Conduction. Heat engines. Carnot cycle in p-V plane.
6.	Problems for Electricity, and Coulomb's law. Substance of Lorentz force.
7.	Electricity. Electric fields. Coulomb's law. Motion of charged particles in a uniform electric field. Electric potential. Application of electrostatics. Capacitors. Combinations of capacitor.
8.	Problems for DC, and AC. What is the relationship between AC circuit powers.
9.	Direct current (DC) circuits. Electric current and resistance. Kirchhoff's laws (junction and loop rule). RC circuit.
10.	Problems for atomic physics, binding energy, and natural radioactivity.
11.	Magnetism. Magnetic fields. Magnetic (Lorentz) force. Motion of a charged particle in a uniform magnetic field. Magnetic force between two parallel conductors. Faraday's law of induction. Transformer. Alternating Current (AC) circuits. AC circuit powers.
12.	Written test 1, and its solution.
13.	Modern physics. Mass and energy. The photoelectric effect. Atomic physics. Size and density of the nuclei. Nuclear fission. Binding energy. Natural radioactivity. Atomic power station in Paks. Safety and waste disposal.
14.	Replacement (supplementary) written test, and its solution.

Mid-term requirements:

Participation in occupations:

It is compulsory to attend the lectures and practices. The rules of education and exam directory (TVSZ) are the guidelines.

Midterms, protocols, reports, etc.:

Written test 1 on the week 13.
Replacement (supplementary) written test on the week 14.

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

Exam application requires a signature.
Signature is a written test. Total points: 100 if score > 40 points (successful) → signature.
If the student has not fulfilled the conditions for obtaining a signature (e.g. did not write or failed the in-class paper, did not hand in the assessment report, etc.), he/she will be given one opportunity to make up the time during the study period. If the student is unable to obtain a signature by this means, and the requirements of the subject provide for this possibility, the student may attempt to obtain a signature once during one of the first ten working days of the examination period, for a fee as set out in the "Regulations on the possible benefits to be granted to students and the fees and charges payable by them" (hereinafter referred to as the "Regulations").

Professional competencies:

- Knowledge of general and specific mathematical, natural and social scientific principles, rules, relations, and procedures as required to pursue activities in the special field of environment protection.
- Able to participate creatively in engineering work based on their multidisciplinary skills, as well as to adapt to continuously changing circumstances.
- Open to professional cooperation with specialists related to their profession but involved in other areas.
- Efforts to improve knowledge by on-going self-education and continuously update their knowledge of the world.

Literature:

1. Serway Jewett: Physics for Scientist and Engineers
2. Bueche, F., Hecht, E.: Schaum's Outline of College Physics, 11th edition, McGraw-Hill Education, 2011.
3. Feynman R., Leighton, R.B. and Sands M.: The Feynman Lectures on Physics. Volumes I-III. Revised and extended edition, Addison-Wesley, 2005.
4. Shankar, R.: Fundamentals of Physics: Mechanics, Relativity, and Thermodynamics. Yale University Press, 2014.
5. Shankar, R.: Fundamentals of Physics II: Electromagnetism, Optics, and Quantum Mechanics. Yale University Press, 2016.
6. Feynman R., Leighton, R.B. and Sands M.: The Feynman Lectures on Physics. Volumes I., II. Revised and extended edition, Addison-Wesley, 2005.
7. Fleisch, D., Kinnaman, L.: A Student's Guide to Waves, Cambridge University Press, 2015.
8. Shankar, R.: Fundamentals of Physics: Mechanics, Relativity, and Thermodynamics. Yale University Press, 2014.

Title of the course: **Technical mechanics**	**NEPTUN-code:** RKXME1EBNF	**Weekly teaching hours:** l+cw+lw 1+2+0	**Credit:** 4 **Exam type**: term mark
Course leader: Lóránt Szabó, Ph.D.	**Position:** senior lecturer	**Required preliminary knowledge:** -	

Curriculum:

Engineering mechanics is the application of mechanics to solve problems involving common engineering elements. The goal of this Engineering Mechanics course is to expose students to problems in mechanics as applied to plausibly real-world scenarios. Dividing of Engineering mechanics. Physical quantities.

Statics (part of dynamics). Basic concepts, fundamentals. Planar forces, force systems. Power system bound to tractrix action on the rigid body. Planar forces, force systems. Centre of gravity, bearing force. Holders and articulated mechanisms. Friction.

Strength of Materials. Basic concepts, stress and stress states. Material Laws. Simple strain of prismatic bars. Stress theories.

Kinematics. The kinematics of a point. Basic concepts, uniform and uniformly changing motion. Projectile motions, circular motion, harmonic motion, swinging motion. Kinematics of the rigid body. Basic concepts, velocity and acceleration states, elemental and finite motions. The kinematics of relative motions.

Kinetics (part of dynamics). Kinetics of the material point, axioms, general theorems. The free, forced and relative motion of the material-point. The kinetics of a rigid body. The moment of inertia, and general theorems and principles. The rotation of a rigid body around an axis, translational and plane motion of a rigid body.

Detailed schedule of the course:

Week	Topics of lectures and practices
1.	Statics. Basic concepts, fundamentals. Fundamental principles of theoretical mechanics. Vectors. The force in Cartesian system of reference. Three laws of Newton, for example: principle of the action and the reaction. Components of the force. Planar forces, force system.
2.	Moment of a force for a given point. Moment of the force for a given axis. Couple of two forces. Reduction of a force in a given point. Cases of reduction. Systems of parallel forces. Center of the parallel forces.
3.	Centre of gravity. Centres of gravity for homogeneous bodies. Laws of friction. Equilibrium of the particle with constraints with friction.
4.	Modelling the action of forces. Statics of the rigid body. Simple, hinged and fixed support. Loads. Beams (holders). Trusses.
5.	Strength of materials. Theory of elasticity. Direct stresses (tensile state). Shearing stress.
6.	Bending stress. Instability (buckling stress). Strength calculation.
7.	Summary of statics and elasticity. Written test one, from statics and strength of materials.
8.	Kinematics of the particle. Motion in one dimension. Position, velocity, and acceleration of the particle.
9.	Motion in two dimensions. Circular motions. Projectile motions.
10.	Summary of kinematics of point-like objects.

11.	Kinematics of the rigid body. Basic concepts, velocity and acceleration states, elemental and finite motions.
12.	The kinematics of relative motions. Kinetics. The laws of motion. Kinetics of the material point, axioms, general theorems. Forces of friction. Work, power, kinetic and potential energy. Work-kinetic energy theorem.
13.	The rotation of a rigid body around an axis, translational and plane motion of a rigid body. Written test two from kinematics and kinetics.
14.	Summary of full semester.

Mid-semester requirements:

It is compulsory to attend the lectures. The rules of education and exam directory (TVSZ) are the guidelines.

Two written tests. Total points: 100 (2x50). Term marks: 85-100%: excellent (5), 70-84%: good(4), 55-69%: average(3), 40-54%: pass(2), 0-39%: fail(1)
If the student has not met the requirements of obtaining the term mark (e.g. has not written or failed the in-class test, has not submitted the measurement report, etc.), he/she must be given one opportunity to make up for the term mark in the study period. If the student is still unable to obtain the term mark through this opportunity and the requirements of the course give an opportunity for it, then the student can make an attempt to obtain the term mark on one occasion on one of the first ten work days of the examination period against a fee specified in the "Regulations of ÓU on possible benefits for students and on fees and charges payable by them" (hereinafter RBF).

Professional competencies:

- Knowledge of general and specific mathematical, natural and social scientific principles, rules, relations, and procedures as required to pursue activities in the special field of environment protection.
- Adequate perseverance and endurance of monotony to perform practical operations.
- Open to professional cooperation with specialists related to their profession but involved in other areas.
- Efforts to improve knowledge by on-going self-education and continuously update their knowledge of the world.
- Responsible proclamation and representation of the value system of the engineering profession; openness to professionally well-founded critical remarks.

Literature:

1. Serway Jewett: Physics for Scientist and Engineers
2. (**Statics**) http://www.icivil-hu.com/Civil team/2nd/Statics/Statics,%20R.C.%20Hibbeler,%2012th%20book.pdf
3. (**Dynamics**) https://docs.google.com/file/d/0Bw8MfqmgWLS4V0NFR2dVUWpuYzg/edi
4. Lóránt Szabó: Physics for Undergraduate Students
5. Lóránt Szabó: The World of Engineering Mechanics (electronic book)

Name of subject: **Discriptive Geometry**	**NEPTUN-code:** RTXAG1EBNF	**Number of hours:** lec+gs+lab 1+0+2	**Credit:** 4 **Requirements:** term mark
Course coordinator: Gabriella Oroszlány Ph.D.	**Title:** assistant lecturer	**Prerequisite:** -	

Curriculum:

Knowledge of the essential technical –and design principles, methods and relationships:basic concepts of the plan and the space geometry.
Modes of representation: 1. Perspective 2. Axonometry.Monge's multi-view representation.
Representation of polyhedra, intersecting a polyhedron with a line or planes, intersection.
Representation of solids of revolution, their intersection with a line, with planes, intersection.
Image plane transformation, rotation, surface development.
Application of computer-aided graphic systems for the display of the constructions.

Detailed schedule of the course:

Educational week	**Topics of lectures and practices**
1.	Introduction. Modeling, representation modes (representation modes used in object design. Representation of the basic geometric shapes that make up the models with the help of the CorelDRAW program, study of the characteristics and properties of the geometric shapes. I.
2.	Spatial shapes, representation of spatial elements, basics of projection representation. Representation of the basic geometric shapes that make up the models with the help of the CorelDRAW program, study of the characteristics and properties of the geometric shapes. II.
3.	Intersection of prism Projection drawing I. (simple prism, pyramid, cone)
4.	Intersection of pyramid Projection drawing II. (rotation of prism, pyramid).
5.	Intersection of solids of revolution (cone) Projection drawing II. (rotation of prism, pyramid).
6.	Intersection of solids of revolution (cylinder) Representation of spatial shapes in axonometric drawing. I. (prism, pyramid, cone)
7.	Intersection of cone Representation of spatial shapes in axonometric drawing. II. (truncated spatial shapes)
8.	Intersection of cylinder Representation of spatial shapes in axonometric drawing. III. (body - flat section)
9.	Projection drawing of truncated spatial shapes.
10.	Interpenetration of cone and cylider Editing the mantle of three-dimensional shapes I. (prism, pyramid, cone)
11.	Interpenetration of cone and cylider (plain shapes) Editing the mantle of spatial shapes II. (body - flat section)
12.	Simple interpenetration (turning shapes) Editing the mantle of spatial shapes III. (truncated shapes)
13.	Seminary test Editing tasks, consultation. Submitting a task.
14.	Supplementary seminary test. Evaluation.

Mid-term requirements:

Attendance at lectures and practices/labs:

Participation in lectures is mandatory, as set in the rules defined by the TVSZ.

Works to submit for evaluation:

Week 11- 13: Deadline for submission of individual or group assignments issued during the semester
Week 13: Seminary test
Week 14: Supplimentary seminary test and evaluation.

Final grade calculation methods:

The condition for obtaining the semester mark is the participation in the practices within the framework regulated by the TVSz, as well as the submission of the works specified (above) in the Moodle system in time, in evaluable quality.
• Writing 1 test, at least for a sufficient grade.
A minimum of 40% of the maximum score must be achieved for a sufficient indoor rating. Students receive their mark based on the results of the test. In case of insufficient dissertation or incomplete, inadequate assignments the result of the mid-term ticket is insufficient. The relevant provisions of the current Study and Examination Regulations apply to the replacement of the mark and the tasks to be submitted. A student may attempt to obtain the supplementary semester mark once per semester, in the first two weeks of the examination period, in accordance with the Study and Examination Regulations of the University of Óbuda.

Professional competencies:

- Knowledge of the general and specific mathematical and scientific principles, rules, relationships and procedures required for product design.
- Ability to design and construct simple products, taking into account the constraints of production technology, expected costs and environmental impact.
- Ability to present product concepts and sketches in drawings using traditional hand techniques.
- Ability to create virtual models of product concepts and products and to prepare technical documentation using three-dimensional computer-aided design systems.

Literature:

1. https://elearning.uni-obuda.hu/ electronic notes and aids prepared by the instructor
2. Jon Allen: Drawing Geometry: A Primer of Basic Forms for Artists, Designers and Architects. Floris Books, Edinburgh, United Kingdom, 2007. ISBN13 9780863156083

Name of subject: **Management and Enterprise Economics (blended)**	**NEPTUN-code:** GVEVG2QBNF	**Number of hours:** lec+gs+lab 2+1+0	**Credit:** 4 **Requirements:** term mark
Course coordinator: Péter Szikora Ph.D.	**Title:** senior lecturer	**Prerequisite:** -	

Curriculum:

The aim of the course is for students to acquire knowledge which will enable them to deal with economic and financial problems from a corporate point of view. Students are introduced to the concepts of enterprise, objectives, business environment, business forms, value creation, production processes, organizational forms, strategy creation and corporate marketing. Students also gain an insight into the development of enterprises, different development strategies, problems of growing, optimal operational size and various other essential aspects of managing a corporation.
The aim of the course is to further develop the students' basic business and economic knowledge and thinking, keeping the practical requirements in mind, with appropriate theoretical knowledge acquisition. Students are introduced into company asset management, labor management issues, cost management, cost accounting methodology, analysis of the economics of investments and the basics of corporate finance. Students alsogain an insight into basic marketing concepts and methods.

Curriculum Description:

week	**Topics of lectures and practices**
1.	Business environment and purpose
2.	General characteristics of the company - Company organisation
3.	Organising and managing companies. Management. Management styles, management theory.
4.	Forms of business
5.	Financial management of the company. Finance, Balance sheet. Examining the economy and efficiency of a company. Controlling.
6.	Running companies. Production. Production management, optimisation and logistics.
7.	Fixed asset management. Investments. Current asset management and storage.
8.	Company human resources management. HR. Market activity of the company. Marketing
9.	Management disciplines: strategy, project, innovation and marketing management, TQM. Environmentally conscious management
10.	Problem and conflict resolution, crisis and conflict management.
11.	Decision theory, decision process, problem and decision relationship
12.	Techniques to stimulate creativity.
13.	Case studies: regarding decision making, responsibility, power and authority.

14.	Written exam

Mid-semester requirements:

The method of assessment: term mark

Based on written exam.

Professional competencies:

- Knowledge of the concepts of economics and environmental economics, project and environmental management, tools in the field of environmental protection.
- Ability to carry out administrative tasks related to environmental protection, to perform official tasks
- Ability to participate in environmental consultancy, advisory and decision-preparation work.
- Understand and credibly represent the role of the environment in society and its fundamental relationship with the world.
- Is open to professional cooperation with professionals in other fields related to his/her profession.
- Strives to continuously improve his/her knowledge through self-learning and to keep his/her knowledge of the world up to date.
- To be accountable to society for the choices he/she makes in the environmental field
- In the performance of his/her professional duties, he/she cooperates with qualified professionals in other fields (primarily economic and legal).

Literature:

1. Kadocsa, Gy. (2007): Entrepreneurial Management. Amicus Press, Budapest – München
2. Spinelli, S., Adams, R. (2011): New venture creation: Entrepreneurship for the 21st Century. McGraw-Hill Education

Name of subject: **Engineering Legal Basics and Consumer Protection**	**NEPTUN-code:** RTXMJ1EBNF	**Number of hours:** lec+gs+lab 2+0+0	**Credit: 4** **Requirements:** exam
Course coordinator: Áron Takács Ph.D.	**Title:** associate professor	**Prerequisite:** -	

Curriculum:

Fundamental rights (Fundamental Rights of Citizens). Knowledge of Hungarian citizenship. Civil law (law of persons, property, property law, law of obligations, contract law, certain types of contracts). Civil law contracts with general terms and conditions. Rules applicable to legal persons and companies, sole proprietorship. Basics of labour law (employment contract and its content, rules on safety and security at work).

Tasks and means of consumer protection, consumer rights. The institutional system of consumer protection law in Hungary and in the European Union. Basic concepts of consumer protection law (goods, products, producer, distributor, etc.) Rules on typical and specific contracts between consumers and businesses (internet and off-premises sales). Rules on marketing. Instructions for use, certification of conformity, packaging and CE marking. Information on marking of goods. Defective performance, warranty of accessories, product warranty, guarantee. Product liability. Handling customer and service complaints. Consumer protection organisations. The role of conciliation bodies and NGOs. Case studies.

Warranty and guarantee rules. Specific rules on consumer contracts.

Copyright (copyright, inventions, patents, trademarks). Basic rules on intellectual property management. Ethical limits in the field of product design.

Detailed schedule of the course:

Educational week	**Topics of lectures and practices**
1.	Subject requirements. Concepts of custom, morality and law, sources of law, hierarchy of sources of law. Fundamental constitutional law: constitution, citizenship, fundamental rights, protection of the constitution, constitutional court, ombudsman, organisation of the judiciary.
2.	Civil law relationship: rights of persons, legal capacity, capacity to act, capacity to blame, rights of personality, sanctions for violation of personality rights, property, possession, sources of law of obligations.
3.	Law of contracts, principles of contract, formation, modification, termination, performance of contracts, breach of contract, damage caused by contract, non-contractual damage, certain types of contracts (sale, purchase, lease, etc.)
4.	Basic knowledge of economic law, creation, dissolution, principles of operation of companies, types of companies. Individual enterprises, non-profit organisations, NGOs.
5.	General knowledge of consumer protection, current issues of consumer protection. The concept of consumer, the concept of consumer contract. Warranty, guarantee. Out-of-store sales. The role of conciliation bodies and other NGOs in consumer protection.
6.	The creation of e-commerce, its legal background (Government Decree 45/2014 (26.II.26.)), termination of electronic contracts, the problem of withdrawal, consumer remedies.
7.	Product warranty, product liability. Concrete examples.
8.	Advertising Law. Concept of commercial advertising, concept of unfair advertising, unfair market conduct.

9.	Price indication of the product, product packaging, instructions for use, assembly instructions, Consumer Information leaflet, importance of CE marking. The possibilities of consumer redress through specific cases.
10.	Copyright, trademarks, patents, designs, inventions, franchising and licensing agreements.
11.	Basics of labour law: principles of labour law, content, termination of employment contracts, liability for damages in labour law.
12.	Consumer protection in business, employment, labour law, employment contract, term of employment, employment contract, term of employment, employment contract, employment contract, employment contract, employment contract protection of businesses and consumers. Design and incorporation of features important for consumers in products and services. The role of EU standards in consumer protection.
13.	Seminary test (ZH)
14.	Supplimentary seminary test.

Mid-term requirements:

Attendance at lectures and practices/labs:

Attendance at the exercises is compulsory, absence according to the TVSZ. Attendance at lectures is also compulsory, for the successful completion of the semester (exam) knowledge of the material presented in the lectures is required.

Tests, minutes, reports, etc.:

Week 13: Seminary test (written exam)
Week 14: Supplementary seminary test (written exam)

Method of obtaining a signature/mid-term mark:

Conditions for obtaining a signature:
1. Active participation in the sessions. Verification by attendance sheet, certified by the student's handwritten signature. Absences may be up to the maximum allowed by the TVSZ, exceeding this limit will result in the student's semester not being completed.
2. The ZHs will be above 40% of the available score satisfactory, 55%-above average, 70%-above good, 85%-above excellent.
If the student has not taken any exams during the semester, but his/her absences have not exceeded the allowed limit, or the exam is unsatisfactory, the student's record in the course book will be "FAILED" in the signature field. In this case, the student may attempt to obtain the signature once during the examination period, in accordance with the conditions specified in the TVSZ (24.§6.point), by applying for a signature make-up examination on one of the first 10 working days of the examination period, on the date indicated by the instructor in the NEPTUN system. The signature make-up examination is a written examination covering the entire semester's material, irrespective of the result of the examination during the semester. The assessment must be at least at the satisfactory level (40%) for the signature.
The grading scale for the signature make-up exam is the same as for the mid-year exam (above 40% of the total score is satisfactory, 55%-above average, 70%-above good, 85%-above excellent).

Professional competencies:

- Knowledge of the basics, boundaries and requirements of marketing, management, environmental protection, quality assurance, information technology, law, economics,

which are integrally related to product design.

- Knowledge of the basic rules of intellectual property management.
- Ability to identify the causes of failures and to select measures to remedy them.
- Market, environment and customer oriented.
- In his/her work, he/she will strive to act in accordance with the law and the rules of engineering ethics.

Literature:

1. https://elearning.uni-obuda.hu/ electronic notes and aids prepared by the instructor
2. Dee Pridgen, Gene Marsh: Consumer Protection Law in a Nutshell (Nutshells) 4th Edition. West Academic Publishing, 2016. ISBN-13: 978-1634604710

Name of subject: Art studies	**NEPTUN-code:** RTXMT1EBNF	**Number of hours:** lec+gs+lab 2+1+0	**Credit:** 4 **Requirements:** exam
Course coordinator: Dóra Papp-Vid DLA	**Title:** associate professor	**Prerequisite:** -	

Curriculum:

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

Detailed schedule of the course:

Educational week	**Topics of lectures and practices**
1.	Introduction to Art History
2.	Romanesque Museum visit (Magyar Nemzeti Galéria)
3.	Gothic Art Exercises and student research
4.	Renaissance Museum visit (Contemporary Museum)
5.	Mannerism Museum visit (Ludwig Museum)
6.	Baroque and Rococo Exercises and student research
7.	Classicism and Romanticism
8.	Realism and Impressionism
9.	Postimpressionism, Midterm
10.	Art Nouveau, Fauvism, Expressionism
11.	Cubism, Dadaism, Futurism
12.	Surrealism, Geometric abstraction. Seminary test (ZH)
13.	Abstract expressionism, Pop Art. Architecture of the XX. century. Students' presentations
14.	Supplementary seminary test

Mid-term requirements:

Attendance at lectures:

Attendance at lectures and practicals 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 dates of the museum visits organised jointly for the groups are fixed after consultation with the students at the time of the assignment. The detailed assignments and specific dates will be published on Moodle.

Requirements for qualification:

Week 12: Final test
Week 13: Submission and presentation of artworks created during the semester.

Week 14: Supplementary test

Method of obtaining the signature/completion of the semester:

To obtain a mid-term grade, the successful completion of the final examination papers and mid-term assignments must be at the appropriate level (all assignments must be at least satisfactory). A satisfactory final examination grade requires 50% of the maximum mark. After the deadline, assignments may only be submitted with a late fee, no later than the week following the deadline.
Requirements for obtaining a signature:
1. active participation in the sessions. Attendance is verified by an attendance sheet with the student's handwritten signature. Absences may be up to the limit allowed by the TVSZ, exceeding this limit will result in the student's semester not being completed.
2. After the deadline, assignments may only be submitted with a late fee, no later than the week following the deadline.
3. For a satisfactory final test, 50% of the maximum mark must be achieved. An unsatisfactory mid-year grade may be corrected according to the provisions of the TVSZ. A grade offered in a supplementary examination with signature is NOT available, only a signature can be obtained! If the result of the examination taken during the term is above 55% or better, it is possible to obtain a mark.
The examination is written (TVSZ § 25), the mark is awarded for a total score above 40% satisfactory, above 55% intermediate, above 70% good, above 85% excellent. The grade is calculated in the following proportions: exam 60%, final papers 20%, practical exercises 20%.

Professional competencies:

- Knowledge of the learning, knowledge acquisition, and data collection methods of the special field of product design, their ethical limitations and problem solving techniques.
- Knowledge of the historical periods, outstanding designers and characteristic objects of industrial design.
- Understand and use characteristic online and printed references characteristic of their special field, both in Hungarian and in at least one foreign language.
- Know and apply the terminology and special expressions of their professional field in
- Hungarian and in at least one foreign language.

Literature:

1. https://elearning.uni-obuda.hu/ electronic notes and aids prepared by the instructor
2. Anne D'Alleva, Michael Cothren: Fundamentals of Art History. Laurence King Publishing. London, United Kingdom, 2021. ISBN13 9781913947019
3. Janetta Rebold Benton: How to Understand Art. Thames & Hudson Ltd. London, United Kingdom, 2021. ISBN13 9780500295830

Title of the course: Learning methodology	**NEPTUN-code:** RTXTM1EBNF	**Weekly teaching hours:** l+cw+lw 1+2+0	**Credit:** 4 **Exam type**: term mark
Course leader: Marianna Halász Ph.D.Prof.	**Position:** professor	**Required preliminary knowledge:** -	

Curriculum:

The aim of the course is to prepare students entering higher education to learn effective and efficient learning strategies, to develop individual conditions for self-regulated learning. Students will learn techniques for tuning in to learning, learning and resting while learning. They develop individual and cooperative learning skills. They will learn to deal with learning difficulties in a conscious way and to form success-oriented learning attitudes. Students will gain comprehensive and practical knowledge of factors influencing learning effectiveness, effective learning methods, effective ways of obtaining and organising information online, learning support interfaces and constructive career development. The main aim is to develop competences that will help students to succeed in the subjects they have studied and to prepare for exams.

Detailed schedule of the course::

Week of Semester	**Topics of lectures and practices:**
1.	Learning challenges in the information society (formal, non-formal, informal learning). The need for a change in learning strategies in higher education, the development of self-regulated learning. Assessing our learning style.
2.	Shaping our learning environment. Online group work for developing a personal learning environment.
3.	Characteristics of youth and adult learning, previous learning experiences. Self-assessment of our learning motivation (goals, interests, values, attitudes), capacities (knowledge, skills, abilities) through questionnaires (online survey - Complex Learning Diagnostic Assessment and Self-Assessment).
4.	Simple learning techniques. Note-taking techniques. Techniques for independent processing of larger materials. Reflections on learning.
5.	Identifying learning difficulties. Questionnaire and evaluation of results.
6.	Using mind maps. Learning about software and their use in learning and teaching (making a mind map for a unit of learning material).
7.	Learning strategies (techniques for tuning into learning, specific methods, relaxation techniques). Known and frequently used learning techniques in the field of technical education.
8.	Speed reading, flash reading. Watching, analysing, and evaluating professional videos. Individual experiments to master the methods.
9.	Understand time management, methods, online techniques (Daily, weekly, monthly learning schedules.)
10.	Co-operative learning techniques (team learning, PBL, IBL, project groups). Development of professional and soft skills at university. Development of group techniques in the online space.
11.	Designing the learning process. Preparation for lectures, exercises, consultations. E-learning. Integrated learning methods. eLearning and mLearning strategies. Discussing experiences, sharing good practices.
12.	Strategies for successful learning (role of NLP techniques). Use of methods (e.g. goal setting, communication techniques, reflection, reframing failures), impact on personal development.
13.	Effective and efficient exam preparation techniques.
14.	Evaluation of the semester.

Mid-semester requirements:

Attendance:

Completion of an online test paper (Moodle) with at least a satisfactory grade (2) in week 13.
Individual development and submission of the four mid-term assignments via Moodle not later than week 13.

Test papers, measurement records, reports, etc. (number, date):

Assignment 1
Assignment 2
Assignment 3
Assignment 4
Test

Methods of qualification:

To receive a grade, the final test and the assignments must be completed at least satisfactorily. The grade is based on the simple mathematical average of the 5 submissions.

Professional competencies:

- The ability to see and manage the phenomenon of learning in a complex way, and to use effective communication techniques.
- Ability to make adequate use of a varied and up-to-date toolbox of learning methods, based on individual needs.
- Ability to learn independently.
- Ability to work in a cooperative way, preferably by listening to the opinions of colleagues under his/her control, in order to solve problems and make management decisions.
- Ability to implement lifelong learning.
- Ability to continuously develop his/her skills by participating in organized training in his/her field.

Literature:

1. Nick Rushby- Dan Surry: The Wiley Handbook of Learning Technology, Wiley-Blackwell, 2016, ISBN: 978-1-118-73643-2
2. John Branch - Paul Bartholomew - Claus Nygaard :Technology-Enhanced Learning in Higher Education, Libri Publishing Ltd., Oxfordshire, UK, 2015, ISBN: 9781909818613
3. Terri Pantuso -Sarah LeMire - Kathy Anders: Informed Arguments: A Guide to Writing and Research, Texas A&M University, 2019
4. Chunfang Zhou: Handbook of Research on Creative Problem-Solving Skill Development in Higher Education, Paratext, 2017, ISBN: 9781522506430

Title of the course: Construction of a tutoring system and modern learning techniques	**NEPTUN-code:** RTXTK1EBNF	**Weekly teaching hours:** l+cw+lw 1+1+0	**Credit:** 3 **Exam type**: term mark
Course leader: Marianna Halász Ph.D. Prof.	**Position:** professor	**Required preliminary knowledge:** -	

Curriculum:

The aim of the course is to prepare students for tutoring, where one or a small group of students receive individual, personalised instruction. The tutorials are designed to develop individual learning pathways, independent learning, subject skills, communication, and social competences, so that students are able to help each other in their learning and thus reduce dropouts. The role of the tutor in reducing dropouts and catching up. The responsibilities of the student mentor, data management of mentored students. The role of the peer mentor. Mentor responsibilities related to role provision. The person of the mentor, the competency requirements of mentoring. Getting to know the peer mentor, the specificities of communication with them. Developing relational skills. Exploring the mentor's prior knowledge, subject skills, and personal characteristics. The characteristics of adult learning. Subject-specific support for the mentored person (mentoring and tutoring). Identification of mentoring problems. Personal mentoring support needs for successful learning progress. Objectives of mentoring support, stages of mentoring work, the spectrum process of mentoring. Planning mentoring support. Choice of mentoring strategies, their application. Methods of mentoring support. Motivating the mentored. Peer learning strategies and techniques. Developing reflective thinking. Levels of reflection. Opportunities for self-development. Processing, analysis, and evaluation of contemporary mentoring case studies. Diagnostic-, formative-, formative-, developmental assessment-, sensitive feedback/evaluation in mentoring. Outcomes of mentoring, holistic evaluation of the mentee. Aftercare of the mentored.

Detailed schedule of the course::

Week of Semester	**Topics of lectures and practices**
1.	The role of the tutor system in reducing drop-outs. Responsibilities of the student tutor, data management protocol.
2.	Specificity of peer tutor roles. Responsibilities related to the role.
3.	The self of the tutor, competency requirements of the role. Getting to know the peer tutees and master the specific communicational strategies. Developing connectional skills.
4.	Exploring the tutee’s prior knowledge, field-specific skills, and personal characteristics. Understand the specificities of adult learning.
5.	Field-specific tutoring for the supported student (mentoring and tutoring).
6.	Identification of tutoring difficulties. The need for personal tutoring for successful learning outcomes.
7.	Objectives of the tutoring interaction, stages of mentoring, spectrum process theory.
8.	Planning the tutoring support.
9.	Choice of supporting strategies and their application. Methods in tutoring. Motivation of the tutees.
10.	Peer learning strategies and techniques.
11.	Developing reflective thinking. Stages of self-reflection. Opportunities in self-development.
12.	Processing, analysing, and evaluating peer tutoring case studies.
13.	Giving constructive, formative, developmental and sensitive feedback in tutoring.
14.	Outcomes of the tutoring. Holistic evaluation of the tutee’s progress. Follow-up of the supported student.

Mid-semester requirements:

Attendance:

Compulsory, according to the TVSZ.

Methods of qualification:

In the practical sessions of the course, you will be required to complete the training tasks and to prepare a written assignment based on the given model.

The mid-year grade (average) is determined by the performance in the practical sessions (50%) and the assessment of the coursework (50%).

The instructor may offer a grade of "excellent" or "good" based on the student's great performance or scientific work during the teaching period, which the student is not compulsory to accept. During the first ten working days of the examination period, the written assignment may be substituted, but there is no such option for the practical assignments.

Professional competencies:

- Able to listen to others sympathetically and give meaningful answers.
- The ability to ask questions that help to self-discover the other person's abilities, personal qualities and aspirations.
- Ability to create an atmosphere of trust that supports the learning/acquisition/catching-up process.
- Ability to consider the confidentiality of the mentored person.
- Empathic and cooperative.
- Ability to help a less experienced student to correct minor mistakes and prevent major mistakes.
- Ability to make a consistent, effective, and efficient professional impact in the mentoring relationship.
- Ability to recognize the needs of the mentored, even if the mentored cannot articulate them.
- Believes in the positive impact of mentoring, especially in professional identification, and is willing to help others.

Literature:

1. Joseph Psotka - L. Dan Massey - Sharon A. Mutter: Intelligent Tutoring Systems: Lessons Learned, Psychology Press, 1988, ISBN: 978-0805801927
2. Scotty D. Craig: Tutoring and Intelligent Tutoring Systems, Nova, 2016, ISBN: 978-1-53614-085-9
3. Beverly Park Woolf: Building Intelligent Interactive Tutors: Student-centered Strategies for Revolutionizing E-learning, Morgan Kaufmann Publishers, 2009, ISBN: 978-0123735942

Title of the course: Student tutorial	**NEPTUN-code:** RTXHT1EBNF	**Weekly teaching hours:** l+cw+lw 0+2+0	**Credit:** 3 **Exam type**: term mark
Course leader: Marianna Halász Ph.D., Prof	**Position:** professor	**Required preliminary knowledge:** -	

Curriculum:

The aim of the course is to provide tutoring to a student or a small group of students in an individual, personalised way. The practical lessons are designed to develop individual learning pathways, independent learning, subject-specific skills, communication and social competences, and to help students meet subject requirements by explaining and practising the subject matter of a particular subject, in order to reduce drop-out rates.

Detailed schedule of the course::

Week of Semester	**Topics of lectures and practices:**
1.	Getting to know your tutor/tutee.
2.	Identification of tutoring problems.
3.	Specific discussion of learning outcomes with the supported student.
4.	Applying communicational, interactional and conflict management techniques in tutoring sessions.
5.	Planning the tutor's activities (developing a tutoring plan), considering the specificities of the supported student.
6.	Motivating the tutee.
7.	Understanding the learning style of the tutored student.
8.	Encouraging the tutored student for independent and persistent learning.
9.	Learning how to put influential strategies into practice.
10.	In-person or online support.
11.	Methods and techniques used by the tutor.
12.	Monitoring the tutoring process; formative and developmental assessment.
13.	Reflection and assessment techniques.
14.	Closing the tutoring activity, summary and documentation of the results.

Mid-semester requirements:

Methods of qualification:

Documentation of the 14-week-long tutoring activity in Moodle. Submission of the tutoring plan (2-3 pp.). Submission of the mis-semester evaluation summary (1 pp.).
The mid-semester mark is determined in 50% by the quality of the implementation of the 14-week-long tutoring activity. 25% of the grade is the mentoring plan and the remaining 25% is determined by the effectiveness of the tutoring programme.

Professional competencies:

- Knowledge of the subject content and ability to transfer knowledge.
- Ability to provide personalised assistance.

- Ability to listen to others sympathetically and give meaningful answers.
- Ability to ask questions that help to self-discover the other person's abilities, personal qualities and aspirations.
- Ability to create a climate of trust that supports the learning/acquisition/catching-up process.
- Ability to take into account the confidentiality of the mentored person.
- Empathic and cooperative.
- Ability to help a less experienced student to correct minor mistakes and prevent major mistakes.
- Ability to make a consistent, effective and efficient professional impact in the mentoring relationship.
- Ability to recognize the needs of the mentored, even if the mentored cannot articulate them.
- Believes in the positive impact of mentoring, especially in the area of professional identification, and is willing to help others.

Literature:

1. Catherine A. Simon - Stephen Ward: A Student's Guide to Education Studies, Routledge, 2020, ISBN 9780367276690
2. Charles Neil: The Tutorial Prayer Book: For the Teacher, the Student, and the General Reader (Classic Reprint) Forgotten Books, 2017, ISBN: 978-1331693697

Name of subject: **Material Science I.**	**NEPTUN-code:** RMXAT1EBNF	**Number of hours:** lec+gs+lab 2+0+2	**Credit:** 4 **Requirements:** term mark
Course coordinator: Judit Borsa Ph.D.	**Title:** professor	**Prerequisite:** -	

Curriculum:

The students get a summary on basic chemistry based upon their high school studies (types of materials, atoms, molecules, primary and secondary bonds). Polymers as most important material for future industrial designers are presented: natural polymers, synthetic polymers(polymerization reactions, structure of polymers and their properties, polymer manufacture methods). Practice: chemical and instrumental (FTIR) analysis of polymers; microscopy, thermal analysis, chromatography, water uptake of hydrogels, evaluation of experimental data.

Detailed schedule of the course:

Educational week	**Topics of lectures and practices**
1.	Introduction: the aim and the program of the subject, types of materials. Associated and composite systems (mixtures, composites, hybrid structures).
2.	Classification, structure and properties of ceramics. Practice/1: Identification of fibrous materials
3.	Classification, structure and properties of metals. Atoms, molecules, primary and secondary bonds, state of matter;
4.	Classification and structure of polymers and plastics. Practice/2: Mechanical characterization of fibrous materials
5.	Polymer production (polymerisation, cross-linking). Metals and alloys: basic concepts. Ceramics: basic concepts, manufacturing
6.	Processing technology of polymers. Practice/3: Chemical characterization of fibrous materials; Processing of thermoplastic polymers
7.	Mid-term test
8.	Set, physical and phase states of polymers, thermomechanical curves. Polymers/1: basic concepts, polymers in the nature, synthetic polymers, polymerization reactions (chain, step), most important synthetic polymers; plastics
9.	Rheological properties of polymers. Polymers/2: Structural characteristics: macromolecules, interactions, degree of order; state of matter, phase, physical states, thermomechanical curves
10.	Applications of plastics. Practice/3: Processing of thermoplastic polymer /
11.	Classification, structure and properties of wood and fibrous materials. Polymers/4: Structural characteristics: macromolecules, interactions, degree of order; state of matter, phase, physical states, thermomechanical curves
12.	Associated and composite systems (mixtures, composites, hybrid structures). Polymers/5: Processing of thermoplastic polymers; fibre-forming polymers, general fibre characteristics, natural and synthetic fibres
13.	Short oral presentation
14.	Supplementary exercises and seminary test

Mid-term requirements:

Attendance at lectures and labs:

Attendance at the lectures is greatly suggested. Attendance at the practices is obligatory as set in the TVSZ.

Tests, reports etc.:

Fulfilment of the oral presentation and participation in the practices
Week 7: Mid-term test
Week 13: Oral presentation
Week 14: Supplimentary exercises and seminary test

The method of obtaining a signature/creating a semester mark:

The final mark is determined by the results of the oral presentations and the test.

Professional competencies:

- Knowledge of the general and specific mathematical and scientific principles, rules, relationships and procedures required for product design.
- Knowledge of the main raw materials used in product design, their production and conditions of use.
- Ability to build, test and verify real models and prototypes using direct digital manufacturing techniques based on traditional and three-dimensional product models.

Literature:

1. https://elearning.uni-obuda.hu/ electronic notes and aids prepared by the instructor
2. Miodownik Mark: Stuff Matters: Exploring the Marvelous Materials That Shape Our Man-Made World. Mariner Books, 2015. **ISBN13 (EAN):** 9780544483941
3. Lawrence E. Murr: Handbook of Materials Structures, Properties, Processing and Performance. Springer Cham, 2015. ISBN: 978-3-319-01815-7
4. W. D. Callister, D. G. Rethwisch: Materials science and engineering, an introduction, Wiley, Eighth edition, 2010: selected chapters

Name of subject: **Material Science II.**	**NEPTUN-code:** RMXAT2EBNF	**Number of hours:** lec+gs+lab 2+0+2	**Kredit:** 4 **Requirement**: exam
Subject owner: Judit Borsa Ph.D.	**Title:** professor	**Pre-requisite:** Material Science I.	

Curriculum:

The subject familiarizes the students with materials from microstructure to macrostructure, basic features, relationships, physical explanation, properties and intervention possibilities needed for the design of material parameters, and some examination procedures.

- Special, moisture-related features of polymer structures. Typical features of fibres.
- Processes and their characteristics related to moisture, moisture absorption and drying. Examinations.
- Structure and characteristics of metals as crystalline materials. Possibilities and characteristic-modifying effects of alloying and heat treatments of metals. Basic examinations of metallic structures.
- Basic terms of mechanical characteristics and examinations. Explanation and principles of bundle and chain in the case of mechanically collaborating systems
- Friction and its accompaniments.
- Explanations of 'membrane'. Membrane structures and their importance.
- Combination of materials. Introduction of composite structures.
- General permeability characteristics (moisture, gas, radiation).
- Isotropy and anisotropy. Direction-related features of 2D products.
- Magnetic and electric features of materials.
- Micro and nano systems. Size-determined characteristics of micro and nano range.
- Failures. Typical failure processes of metals, polymers and composite structures.

Detailed schedule of the course:

Educational week	**Topics of lectures and practices**
1.	Material selection criteria, use of selection charts and programs.
2.	Measurement theory principles of material testing.
3.	Microscopic tests
4.	Non-destructive flaw detection tests.
5.	Mechanical properties testing I.
6.	Mechanical properties testing II.
7.	Mechanical properties testing III
8.	Physical properties testing I.
9.	Physical properties testing II.
10.	Testing physical properties III.
11.	Examination of chemical properties
12.	Chemical properties testing II
13.	Examination of chemical properties III. Seminary test.
14.	Thermal analytical tests. Supplimentary seminary test.

Mid-term requirements:

Attendance at lectures and practices/labs:

Attendance at the exercises is compulsory, absence according to the TVSZ. Attendance at lectures is also compulsory, for the successful completion of the semester (exam) knowledge of the material presented in the lectures is required.

Tests, minutes, reports, etc.:

Homework assignments/notebooks from the exercises.
Week 13: Final seminary test on the material of the exercises.
Week 14: Supplementary seminary test.

Method of obtaining a signature/mid-term mark:

Prerequisite for obtaining a signature:
- valid participation in the exercises
- homework/notebooks accepted by the tutor
- at least 50% of the final examination.

The semester ends with a written exam, so the semester grade is composed of: the result of the exam (60%), the average of the percentage of completed homework/protocols (20%) and the result of the ZH. The resulting performance in % is converted into the following grades:
50-60% = satisfactory (2), 61-70% = average (3), 71-85% = good (4), 86-100% = excellent (5)
An unsatisfactory mark resulting from a missing transcript can be made up by submitting the missing transcript, while an unsatisfactory mark resulting from an unsatisfactory ZH result can be made up by taking a make-up ZH on the first 10 days of the examination period, on the date to be announced.

Professional competencies:

- Knowledge of the general and specific mathematical and scientific principles, rules, relationships and procedures required for product design.
- Knowledge of the main raw materials used in product design, their production and conditions of use.
- Ability to build, test and verify real models and prototypes using direct digital manufacturing techniques based on traditional and three-dimensional product models.

Literature:

1. https://elearning.uni-obuda.hu/ electronic notes and aids prepared by the instructor
2. Miodownik Mark: Stuff Matters: Exploring the Marvelous Materials That Shape Our Man-Made World. Mariner Books, 2015. **ISBN13 (EAN):** 9780544483941
3. Lawrence E. Murr: Handbook of Materials Structures, Properties, Processing and Performance. Springer Cham, 2015. ISBN: 978-3-319-01815-7

Name of subject: **Industrial Technologies and Machines I. (blended)**	**NEPTUN-code:** RTEIT1EBNF	**Number of hours:** lec+gs+lab 1+0+1	**Credit:** 4 **Requirements:** term mark
Course coordinator: Gabriella Oroszlány Ph.D.	**Title:** assistant lecturer	**Prerequisite:** -	

Curriculum:

Machinery fundamentals, basic concepts, principles and operational requirements are closely related to the product design expertise area. Operation, development and relations of structural units and building elements of ubiquitous machines of industrial technologiesand simple technical systems. Kinematic basic concepts and fundamental mechanisms. Mechanisms of degrees of freedom (DOF calculations), structural - kinematic analysis.
The material processing and manufacturing process technology associated with each step of the special equipment, their structure, operating principles and basic concepts.
Textile machinery, non-woven fabrics production of machines, production machines ofknitted products. Finishing machines, equipment used for painting and patternmaking. Types and operating principles of equipment for carrying out the key packaging productsand packaging operations.
The latest development trends, solutions and innovations.

Detailed description of the course:

Educational week	**Topics of lectures and practices**
1.	Lecture 1: History of spinning, development of basic spinning tools, spinning technology. Main types of machines used in yarn production, their characteristics and applications.
2.	Practice 1: Specific spinning technologies. Yarn testing methods, gauge calculation.
3.	Lecture 2: Artificial alteration of yarn properties and characteristics for use. Spreading technology, equipment and properties of spread yarns.
4.	Practice 2: Technology and equipment for the production of nonwovens
5.	Lecture 3: History of weaving. the development of basic weaving tools, weaving technology. Basic concepts related to weaving and fabrics. The main types of machines used in weaving, their characteristics and uses.
6.	Practice 3: Technical characteristics of woven fabrics (area density, thickness...etc.). Basic weaves (plain weave, plain weave, atlas weave).
7.	Lecture 4: History of knitting, evolution of basic knitting tools, technology of knitting. Basic concepts of knitting and knitted fabrics. Main types of machines used in knitting, their characteristics and applications.
8.	Practice 4: Basic knitting technology and characteristics of knitted fabrics. Practical production of knitted fabrics.
9.	Lecture 5: Textile technology and equipment I. Systematisation of textile manufacturing operations (saturation, drying, condensation, pile raising, shearing, pre-cleaning, sanding, scouring, scouring, calendaring, creping technology and equipment).
10.	Practice 5: Basic kinematic concepts, basic mechanisms. Definition of degrees of freedom of mechanisms, structural - kinematic analysis.
11.	Lecture 6: Textile finishing technology and equipment II. Fake creping, prage calendaring, tufting, textile engraving, textile abrasion, laser cutting, devoré printing, flocculation, embossing, lacquer finishing, antibacterial finishing, special finishing processes, carbon repellent finishing, deodorant finishing, antimicrobial finishing, mite and moth proofing.
12.	Practice 6: Degree of Freedom Calculation - investigation of planar and spatial mechanisms - practical calculation exercises.

13.	Seminary online test (written exam). deadline for submission of individual or group assignments issued during the semester
14.	Supplementary online Test. Supplementary submission of tasks.

Mid-term requirements:

Attendance at lectures and practices/labs:

Attendance at the exercises is compulsory, absence according to the TVSZ. Attendance at lectures is also compulsory, for the successful completion of the semester (exam) knowledge of the material presented in the lectures is required.

Tests, minutes, reports, etc.:

Week 13 – Test (written exam)
Week 13 - deadline for individual or group assignments due during the semester
Week 14 - revision and supplementary tests
Week 14 - submission of supplementary assignments

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

The mid-term grade is conditional on:
- valid participation in the exercises,
- the assignments, submitted and accepted in the form of a report on the topics of the exercises,
- 1 final paper of approximately 60 minutes, graded with a satisfactory mark (the final paper will consist of material from the online lectures and the exercises - it will be a test and will be different from the lectures).

To obtain a satisfactory final examination grade, a minimum of 40% of the maximum mark must be achieved and may be made up once.
The mid-semester grade will be based on the result of the final examination.
The relevant provisions of the current Study and Examination Regulations apply to the replacement of the mid-term mark.

Professional competencies:

- Knowledge of basic design principles and methods, as well as major production technology procedures and operating processes.
- Knowledge of the most important basic materials applied in the special area of product design, their production and their application criteria.
- Able to interpret and characterize the structure and operation of the structural units and components of relatively simple technical systems, as well as the design and connection of the system components applied.
- Able to explore the causes of failures and to select elimination operations.

Literature:

1. Steven R. Schmid, Bernard J. Hamrock, Bo. O. Jacobson: Fundamentals of Machine Elements, ISBN 9781439891322
2. Machine elements, handbook, http://www.gbi.bgk.uni-obuda.hu/oktatas/segedanyagok/gepelemek/Machine_Design_2/Machine%20Element.pdf
3. https://elearning.uni-obuda.hu/ electronic notes and aids prepared by the instructor

Name of subject: **Industrial Technologies and Machines II. (blended)**	**NEPTUN-code:** RTEIT2EBNF	**Number of hours:** lec+gs+lab 1+0+1	**Credit:** 4 **Requirements:** exam
Course coordinator: Gabriella Oroszlány Ph.D.	**Title:** assistant lecturer	**Prerequisite:** Industrial Technologies and Machines I.	

Curriculum:

Further machinery fundamentals, basic concepts, principles and operational requirements which are closely related to the product design expertise area.
The material processing and basic settings of special equipment for each process step of the manufacturing process. Knowledge of the structural parts of machines (mechanical machine components, pneumatic components, etc.) will enable to understand the design and the operating principle of machines and make it possible to select the appropriate machines and equipment.
Working principles and structural designs of the overall garment processing equipments (sewing machines, irons and glue machines, presses etc.).
Special clothing machining: clothing welding, laser cutting, engraving technology tools, sewing machines and pneumatic cam control.
The latest developments and innovative solutions of equipments producing packaging tools and performing packaging.

Detailed schedule of the course :

Educational week	**Topics of lectures and practices**
1.	Lecture 1: Classification of patterns and tailoring tools. Tools and equipment used for tailoring light industrial products (textiles, leather and paper... etc.).
2.	Practice 1: Special techniques and equipment - braiding, rope stitching. Applications of braiding and rope beading technologies in product design.
3.	Lecture 2: History of the sewing machine, technological solutions for mechanisation of the sewing operation, recent developments and design of sewing machines.
4.	Practice 2: Construction of basic stitch sewing machines. Types of stitch forming devices and their operation and construction. General operation of sewing machines, typical faults and maintenance tasks.
5.	Lecture 3: History, technical and technological development of ironing and gluing equipment used for smoothing and shaping of textile products. Construction and principle of operation of ironing and gluing equipment used in factory production. Typical applications for each type of equipment.
6.	Practice 3: Special ironing equipment used for the decoration of textile garments - Introduction to the technology and machinery for making pleats.
7.	Lecture 4: Paper making and packaging equipment I. History of paper making, technology, tools and machinery for paper production.
8.	Practice 4: Automation of sewing. Investigating the relationship between automation and designer creativity - Pamphlet editing.
9.	Lecture 5: Paper making and packaging equipment II - History of packaging, classification of different packaging materials, their uses, technology, tools and machinery for the production of packaging materials.
10.	Practice 5: Welding technology and machinery for synthetic sheet products. The relationship between welding of synthetic sheet products and product design.
11.	Lecture 6: Application of electropolishing in product design. General technology and principle of operation of electropolishing.
12.	Practice 6: Characteristics and design of pneumatic systems and their components, principle of operation. Characteristics of pneumatic systems used in light industrial automation.
13.	Test (ZH) online. Deadline for submission of individual or group assignments during the semester
14.	Supplementary test. Supplementary submissions.

Mid-term requirements:

Attendance at lectures and practices/labs

Attendance at the exercises is compulsory, absence according to the TVSZ. Attendance at lectures is also compulsory, for the successful completion of the semester (exam) knowledge of the material presented in the lectures is required.

Tests, minutes, reports, etc.

Week 13 – Test (ZH)
Week 13 - deadline for individual or group assignments due during the semester
Week 14 - revision and supplementary tests
Week 14 - submission of supplementary assignments

Method of obtaining a signature/mid-term mark

The prerequisite for obtaining a signature:
- Valid participation in the exercises,
- Individual or group assignments issued during the semester must be completed and handed in by the deadline.
- Writing of 1 final examination paper with a grade of at least satisfactory.

A minimum of 50 % of the maximum mark for the final examination must be achieved for a satisfactory grade.
The mark will be awarded on the basis of the result of the final examination if the individual or group assignments have been handed in on time and accepted.
The relevant provisions of the current Study and Examination Regulations apply to the replacement of the signature.
Examination is written and take approximately 60 minutes.
The assessment is based on the percentage of marks obtained:
0 - 49% unsatisfactory,
50 - 62 % satisfactory
63 - 75 % moderate,
76 - 88 % good
89 - 100 % excellent

Professional competencies:

- Knowledge of basic design principles and methods, as well as major production technology procedures and operating processes.
- Knowledge of the most important basic materials applied in the special area of product design, their production and their application criteria.
- Able to interpret and characterize the structure and operation of the structural units and components of relatively simple technical systems, as well as the design and connection of the system components applied.
- Able to explore the causes of failures and to select elimination operations.

Literature:

1. Steven R. Schmid, Bernard J. Hamrock, Bo. O. Jacobson: Fundamentals of Machine Elements, ISBN 9781439891322
2. Machine elements, handbook, http://www.gbi.bgk.uni-obuda.hu/oktatas/segedanyagok/gepelemek/Machine_Design_2/Machine%20Element.pdf
3. https://elearning.uni-obuda.hu/ electronic notes and aids prepared by the instructor

Title of the course: **Technical drawing and documentation**	**NEPTUN-code:** RKEMR1EBNF	**Weekly teaching hours:** l+cw+lw 1+0+2	**Credit:** 4 **Exam type**: term mark
Course leader: Rita Kendrovics-Boda, Ph.D.	**Position:** associate professor	**Required preliminary knowledge:** -	

Curriculum:

The aim of this course is to introduce drawing fundamentals and to develop drawing skills of students. The first part of the course covers such topics as layout of Technical Drawings, line styles, lettering, scale, geometric construction, transformation, projection (orthographic projection, central or perspective projection, oblique projection), axonometric view (isometric, diametric, Cavalier etc.). The second part of the course focuses on topics as follows: sketching, dimensioning, sectioning, fits and tolerances, surfaces roughness, symbolical representation, detail and assembly drawing.

Detailed schedule of the course::

Modul	**Topics of lectures**
1.	Introduction to the technical drawing: Drawing standards, layout of drawings, lines, letters
2.	Systems of projection – Multiview projection Monge projection
3.	Systems of projection - Axonometric projections
4.	Section views: full-, half-, broken-, offset-, removed sections
5.	Dimensioning
6.	Representation of threaded surfaces
7.	Signs of surface machining on the technical drawing
Weeks	**Topics of lectures and practical works**
2	Basic of technical drawing: projection Geometric constructions Homework 1: Study aid 7.3
4	Projections of the machine elements in the technical drawing
6	Axonometric projections Objects with circular geometry and their projections
8	Section drawings Section views - cylinder Homework 2: Study aid: 7.11
10	Detail drawings (views +dimensions) based on axonometric drawing and machine part Homework 3: detail drawing of machine part
12	Written exam - test 55 points
14	Reading of drawing - practical Repeat exam

Mid-semester requirements:		
Attendance:		
Participation in lectures and practical sessions: compulsory		
Test papers, measurement records, reports, etc. (number, date)		
1.	Homework 1 - Projections	15 points
2.	Homework 2 - Cylindric sections	15 points
3.	Homework 3 - Detail drawing of machine part	15 points
4.	Written exam – test	55 points
Methods of qualification:		

Attendance at lectures and practical works, passing written test (exam) (with minimum mark 2) during the semester.

- 3 drawing tasks (homework): 15 x 3 = 45 points
- test on tech. drawing (written exam): 55 points

Altogether : 100 points

Mark: 0-40 points: 1(fail); 41-55 points: 2 (pass); 56-70 points: 3 (satisfactory); 71-85 points: 4 (good); 86-100 points: (excellent)

In case of mid-semester mark fail (1), correction opportunities are available according to 17§(6) of Education and Examination Regulations (TVSZ).

Professional competencies:

- In possession of state-of-the-art IT skills, being able to use professional databases and certain design, modelling, and simulation software depending on their specialty.
- Adequate perseverance and endurance of monotony to perform practical operations.
- Able to cooperate with engineers involved in the development and application of production and other technologies to develop the given technology in terms of environment protection.
- Able to participate creatively in engineering work based on their multidisciplinary skills, as well as to adapt to continuously changing circumstances.

Literature:

1. Addisu Dagne Zegeye: A Textbook of Engineering Drawing: for Undergraduate Engineering Students, Independently Published, 2020, ISBN: 9798656430043
2. Coli H.Simmons, Dennis E. Maguire: Manual of Engineering drawing in e-learning system
3. David Anderson: Technical drawing, Spring, 2006
4. Sachidanand Jha: AutoCAD Mechanical: 400 Practice Drawings For AUTOCAD MECHANICAL and Other Feature-Based 3D Modeling Software, Independently Published, 2019, ISBN: 1070883298

Name of subject: **Informatics (blended)**	**NEPTUN-code:** RMEIF1EBNF	**Number of hours:** **lec+gs+lab** 1+0+3	**Credit:** 4 **Requirements:** term mark
Course coordinator: Eszter Kormány Ph.D.	**Title:** senior lecturer	**Prerequisite:** -	

Curriculum:

The aim of the course is to provide a basic knowledge of IT for university studies and future engineering work. In the lectures of the course, students will learn about computer architecture, the hardware and software components required for operation, ethical and safe computer use, the basics of database management and programming, algorithm description tools and their use.
The exercises include data analysis, problem solving and algorithmic exercises. The knowledge gained can be used for coursework and in future work. Students will learn how to create and manage databases using Ms Access, design databases, normalization steps, create tables, set up key relationships, query, report and use SQL language. Simplify algorithms, create functions to extend the toolset of the Ms Office application.

Detailed schedule of the course:

Educational week	**Topics of lectures and practices**
1.	Introduction of the course MsOffice Application Word. Computer generations. The structure and operation of computers. Excel worksheet structure, settings, formatting, cell references: absolute (also by name), relative references. Simple statistical and text functions MsOffice Word Basic
2.	MsOffice Application Excel Basic and Financial functions. Operating systems. Computer networks (Local networks and Internet) Grouping of softwares. MsOffice Application Word Mail Marge
3.	MsOffice Application Excel What-if Analysis MsOffice Application Excel Basics
4.	MsOffice Application Excel as Database MsOffice Application Excel Financial Functions
5.	MsOffice Application Excel Power BI MsOffice Application Excel What-if Analysis Goal Seek, Data Table
6.	MsOffice Application Excel Solver Trendline
7.	Test MsOffice Application Excel Solver Shortest Problem
8.	Networks in the operation of complex systems MsOffice Application Excel Solver Function Analysis, Transportation Problem
9.	MsOffice Application Excel as Database (Sort, Filter, Advanced Filter)
10.	Introduction to Multimedia MsOffice Application Excel PivotTable, Power Pivot
11.	Basic knowledge of Word (formatting, creating columns, using headings, creating a table, inserting images, editing equations, using different headers and footers. Creating a table of contents -, table of figures -, index -, footnotes. Recording sources, inserting references in the text, creating a bibliography)
12.	Presentations.
13.	Seminary test (ZH)
14.	Supplementary seminary test.

Mid-term requirements:

Attendance lectures and practices/labs

Participation in the exercises is compulsory, absence according to the TVSZ. Attendance at lectures is also compulsory, for the successful completion of the semester (exam) knowledge of the material presented in the lectures is required.

Tests, minutes, reports, etc.

Week 7: Test 1
Week 12: Upload the homework into the Moodle eLearning system.
Week 13: Seminary test 2
Week 14: Supplementary seminary test

Method of obtaining a signature/mid-term mark:

Signature requirement:
- Completion of the exercises,
- Preparation of the minutes and submission in the laboratory exercise following completion,
- a minimum of a final paper on the material from the exercises. 51%,
- 1 min. 51% of the final grade, 51% of the final grade, 51% of the final grade, and 1 min. 80%, ZH 2 min. 51%.

A student who does not have a signature at the end of the semester may attempt to obtain a signature (in case of failure in the ZH) once in the first two weeks of the examination period. The signature requirement is the same as during the mid-year. The written examination and the final mark will be based on the results of the written tests and the work submitted to obtain the signature.

Professional competencies:

- Ability to learn new skills through solving practical problems through experience.
- With up-to-date IT skills, you can use professional databases and, depending on your specialisation, design, modelling and simulation software.
- Have the stamina and tolerance of monotony needed to carry out practical activities.
- Understand and use online and printed literature in Hungarian and at least one foreign language.

Literature:

1. PPT files on the homepage of Moodle learning system

Name of subject: **Colour Theory and Colorimetry**	**NEPTUN-code:** RTXSZ1EBNF	**Number of hours:** **lec+gs+lab** 2+0+2	**Credit:** 4 **Requirements:** term mark
Course coordinator: Ákos Borbély Ph.D.	**Title:** associate professor	**Prerequisite:** -	

Curriculum:

Basic notions of color theory. The physical, physiological and psychological bases connected to colors. The spectrum of electromagnetic radiation, optical radiations. The structure of the human eye, photoreceptors, the structure of the retina. The general context of visual performance, the basics of color vision, the properties of color perception. Color features. The factors influencing color sensing. The methods and tools of color communication: the questions of subjective and objective color characterization; color systems, color sample atlases. The basic principles of color systems. The bases of color measurement, the objective modelling of reduced color vision. The methods and instruments of color stimulus measuring spectrophotometers. Color contrasts. Color harmony systems. The effects and functions of colors, colorful environment. The basics of color dynamic design, the relationships of people and colors. The special characteristics of color usage. The questions of color reproduction, reproducible color ranges. Colorful techniques.
The most important practical methods of the professional field.

Detailed schedule of the course:

Educational week	**Topics of lectures and practices**
1.	Colours. The importance of colour in design. Tools - use of tools. Painting coloured surfaces - practice.
2.	Use of colours in historical periods I. Tone painting exercise.
3.	Historical use of colour II. Contrasts. Colour mixing exercise. Colour wheel editing.
4.	Notable colour contrasts. Colour circle painting exercise I.
5.	Colour harmony types. Colour wheel painting exercise II.
6.	Colour functions and their role in design. Colour and tone painting exercise I.
7.	Physical, physiological and psychological principles of colour, colour communication and colour systems. Colour and tone painting exercise II.
8.	Spectrum of electromagnetic radiation; generation of optical radiation, spectra; luminescence, radiometric and photometric quantities. Painting colour and tone painting excersise III.
9.	Structure of the human eye, photoreceptors, structure of the retina. Basics of human colour vision, properties of colour vision. Colour and tone painting IV.
10.	The standard colour measurement system I. Contrasts exercise I.
11.	The standard colour measurement system II. Contrasts exercise II.
12.	Light sources, standard radiation distributions, colour reproduction. Contrasts exercise III.
13.	Seminary test (ZH). Completion of practical work.
14.	Supplementary seminary test.

Mid-term requirements:

Attendance at lectures and practices/labs:

Participation in the exercises is compulsory, absence according to the TVSZ. Attendance at lectures is also compulsory, for the successful completion of the semester (exam) knowledge of the material presented in the lectures is required.

Tests, minutes, reports, essays, etc.:

Week 1.: Submission of practical tasks.
Week 13: 1 Seminary test. For a satisfactory final examination grade, 50% of the maximum mark must be achieved.
Week 14: Supplementary seminary test

Method of obtaining a signature/mid-term mark:

A successful final etest and the completion of the practical assignments at the appropriate level are required to obtain a mid-year mark. The mid-year mark is obtained by taking 50% of the examination and 50% of the practical work into account. A student who failed the test or the completition of the works at the end of the semester may attempt to obtain once in the first two weeks of the examination period. The final mark will be based on the results of the written test and the work submitted to obtain the signature.

Professional competencies:

- Knowledge of basic ergonomic and psychological methods, rules and standards for the design of industrial products.
- Understands and uses the online and printed literature in Hungarian and at least one foreign language.
- Knows and uses the language and special terms of his/her field of specialisation in Hungarian and at least one foreign language.
- Ability to justify decisions on the designed product, to test them and to support them with technical and standard test methods.

Literature:

1. https://elearning.uni-obuda.hu/ electronic notes and aids prepared by the instructor
2. Josef Albers: Interaction of Color: 50th Anniversary Edition. Yale University Press, United States, 2020. ISBN13 9780300179354

Name of subject: **CAD/CAM I.**	**NEPTUN-code:** RTXCC1EBNF	**Number of hours:** **lec+gs+lab** 0+0+3	**Credit:** 4 **Requirements:** term mark
Course coordinator: Eszter Kormány Ph.D.	**Title:** assistant lecturer	**Prerequisite:** Informatics I.	

Curriculum:

The course introduces students to the theoretical foundations of computer-aided design (Adobe Illustrator and Adobe Photoshop). Using computer applications, they will practice various image manipulation and drawing methods. Skills development will include learning how to adapt visual branding to different products/forms and how to process their own photos for different applications.

Interoperability between different systems. Standard data exchange formats. The data formats necessary for production. Solution of tasks from conceptual modelling to tool making.

The role of realistic display in technical design systems.

The basic knowledge of the graphic design of composition tasks and visual image elements.

Detailed schedule of the course:

Educational week	**Topics of lectures and practices**
1.	A brief theoretical introduction to vector graphics, the relationship between vector and bitmap graphics, Drawing tables, using a workspace, creating shapes, using a shape shaper.
2.	Drawing with pen and pencil, drawing with a brush. Selection, alignment. Use of alignment tools, Alignment, Arrangement, Grouping of objects, Alignment of points.
3.	Creating and editing shapes, using shape tools, open, closed curves, combining shapes, reshaping, scaling, mirroring, rotating, distorting objects.
4.	Colouring objects, colour modes, editing colour swatches, applying and editing patterns, using layers.
5.	Using text, creating text, formatting text, using text box.
6.	ZH in the exercise on topics 1-5
7.	Photoshop skills. Introduction to pixel graphics, graphic formats. Colour knowledge, concepts of TrueColor and palette.
8.	Image retouching, concept and use of the graphics envelope. Effects, exercises: removing distracting landmarks from images.
9.	Using layers, creating transparent images (Gif86 / PNG). Exercise: creating "Fantastic Landscapes" using layers and effects.
10.	Using 3D effects in Photoshop. Practice: "stretching" Logo images on fixtures.
11.	Using Photoshop's pixel-oriented effects, mixing filters and image effects.
12.	Seminary test (ZH) on topics 7-11.
13.	Completition of works.
14.	Supplementary seminary test.

Mid-term requirements:

Attendance at lectures and practices/labs

Participation in the exercises is compulsory, absence according to the TVSZ.

Tests, minutes, reports, essays, etc.

2 "half" final exams in weeks 6. and 12.
1 homework assignment per subject is compulsory.
Final deadline for revision and supplementary tests and late assignments: week 13-14.

Method of obtaining a signature/mid-term mark:

Prerequisite for obtaining a mid-year grade:
- Valid participation in laboratory exercises,
- Individual or group assignments given during the semester must be completed and handed in by the deadline
- 2 examinations (ZH) with at least a satisfactory grade.
For a satisfactory final examination, a minimum of 40% of the maximum mark must be achieved. The mid-term mark is based on the result of the two tests. In the case of an unsatisfactory tests or incomplete or inappropriate assignments, the mid-term mark will be insufficient. The relevant provisions of the current Study and Examination Regulations apply to the replacement of the mid-term mark and the assignments to be submitted.

Professional competencies:

- Knowledge of basic design principles and methods, major manufacturing processes and operational procedures.
- Ability to design simple products in terms of form and construction, taking into account manufacturing constraints, expected costs and environmental impact.
- Ability to create virtual models of product concepts and products and to prepare technical documentation using three-dimensional computer-aided design systems.
- Have the stamina and tolerance for monotony required to carry out practical activities.

Literature:

1. https://elearning.uni-obuda.hu/ electronic notes and aids prepared by the instructor
2. Books of Adobe® Photoshop® és Illustrator® programs

Name of subject: **CAD/CAM II.**	**NEPTUN-code:** RTXCC2EBNF	**Number of hours:** lec+gs+lab 0+0+3	**Credit: 4** **Requirements:** term mark
Course coordinator: Orsolya Nagyné Szabó Ph.D.	**Title:** assistant lecturer	**Prerequisite:** CAD/CAM I.	

Curriculum:

Virtual modelling and visualisation of products using computer systems used in engineering practice. Preparation of technical documentation. The language and specialised terminology of computer programmes.
Engineering vector graphics systems. Basic functions, creation and modification of shapes and forms, transformations, zooming, navigation, alignment, editing curves, cutting tools, other profession-specific representations. Learning, using and practising computer-aided drafting techniques. Editing and displaying clothing, interior and packaging products, providing information for production using computer tools.

Detailed schedule of the course:

Educational week	**Topics of lectures and exercises**
1.	Review of the curricula Introduction of the use of Solid Edge. Usage of documents, (type of documents, files, designing environment) User interface (opener screen, designing environment).
2.	The solid modelling, 2D modelling, Principle of ordered and synchronous modelling. Sketching. Types of constraints and its usage (geometrical relates, dimensions).
3.	Ordered modelling: Extrude/Cut Revolve/Revolved cut Round/Chamfer
4.	Ordered modelling: Surface curves, projection Boolean operations Modification of dimensions with help of variables, variable table
5.	Ordered modelling Drafting
6.	Assembly design: Mate, Planar and axial align constraints Connect, Cam constraints
7.	Control of laboratory work
8.	Assembly design: Assembly commands, explode view Render of view Moving of component .
9.	Modelling exercises
10.	Modelling exercises
11.	Rendering with Keyshot
12.	Rendering with Keyshot
13.	Control of laboratory work

14.	Presentation of the laboratory work. Evaluation.

Mid-term requirements:

Attendance at lectures:

Laboratory work is compulsory. The rules of education and exam directory (TVSZ) are according to the guidelines. The designs and exercises created during the semester must be submitted to Moodle on the 13th week of education.

Requirements for qualification:

Submission of the designs and exercises created during the semester.

Method of obtaining the signature/completion of the semester:

The final marks are determined from the results of the class exercises created during the semester. These are to be submitted on Moodle.

Professional competencies:

- Knowledge of basic construction designs and their sizing principles.
- Ability to use three-dimensional computer-aided design systems to create virtual models of product concepts or products and to prepare their technical documentation.
- Ability to build, test and verify real models and prototypes using direct digital manufacturing techniques based on traditional and three-dimensional product models.
- Ability to apply computational and modelling principles and methods from the industrial product design literature.

Literature:

1. Books of Adobe® Photoshop® and Illustrator® programs
2. https://elearning.uni-obuda.hu/ electronic notes and aids prepared by the instructor

Name of subject: **Product Design Methodology and Design (blended)**	**NEPTUN-code:** RTXTM1EBNF	**Number of hours:** lec+gs+lab 4+0+0	**Credit:** 4 **Requirements:** exam
Course coordinator: Daniella Koós DLA	**Title:** associate professor	**Prerequisite:** Form Design I.	

Curriculum:

Product life cycles and the product environment. Design schools. The product development process, exploring and defining the product idea. Optimisation of product characteristics.
Developing a product concept. Product features. Product functions, technical (materials, technologies, ergonomics), economic (marketing, energy optimisation, technology), psychological (impact on the consumer, safety), sociological (prestige, brand), ecological (resource management), and documentary (historical and contemporary stylistic interpretation) functions and methods for the design of industrial products. Cost factors in design. Design for manufacturability.
Historical periods, subjects and creators of industrial design. Design aspirations and opportunities in the past and present. Design principles. Functions of industrial design, design process. Industrial Revolution. Art Nouveau.
Functional design. Progressive and conservative modernism. Industrial design after the First World War. Avant-garde, Constructivism, Bauhaus. Art Deco in Europe and America. The American model of commercial design. European design after World War II. Design in the second half of the 20th century. Organic design. Systematic design. Design trends in the early 21st century.

A detailed schedule of the course:

Educational week	**Topics of lectures and exercises**
1.	Introduction to the course content. What is design? – Concept and terms. Design thinking. Multicultural and multifunctional design.
2.	Design product features. Applied arts - Art, Craft, Design.
3.	The beginnings of industrial design, the 19th century and design. Industrial approach to design, areas of design (elite, product, styling, industrial design).
4.	Art Nouveau I. - Vegetal and organic trends. Approaches to product design.
5.	The Art Nouveau II. Geometric movement. Basic concepts of product design: product, product life cycle, need and function 1.
6.	Progressive modernism – The Avantgarde Design Basic concepts of product design: product, product life cycle, need and function 2.
7.	Bauhaus and its influence on 20th century design. Value-analysis product design methodology (function tree, requirements list).
8.	Art Deco Positioning.
9.	Conservative modernism. Innovation.
10.	Commercial design - American elite design. Creative group techniques.

11.	Elite design - New modernism in Europe. Sustainability and eco-design.
12.	Neoavantgarde. Postmodern. The last decades of the 20th century and contemporary design aspirations. Social design. Seminary online test (Design).
13.	Seminary test (Design methodology).
14.	Supplementary seminary tests, evaluation.

Mid-term requirements:

Participation in occupations:
The Design part of the course is taught online and the Product Design Methodology part is taught through contact lectures. Attendance of the lectures and continuous learning of the online course materials is recommended.

Seminary tests, reports, essays, etc.
Week 12: Seminary design test (online in Moodle)
Week 13: Seminary test (methodology)
Week 14: Supplementary seminary tests
Week for both exams, 50% of the maximum mark must be achieved to obtain a pass mark.

The method of obtaining a signature/creating practice mark:
The successful completion of the two tests is a prerequisite for obtaining the mid-year mark. The method of calculation of the mid-term mark: the results of the final examination papers in the two subjects will be taken into account in a 50/50 split.

Professional competencies:

- Knowledge of basic design principles and methods, major manufacturing processes and operational procedures.
- Knowledge of the basic rules and technological constraints for shaping products and finding the right balance between content and form.
- Knowledge of the main raw materials used in product design, their production and conditions of use.
- Knowledge of the basic construction designs and the principles of their sizing.
- Knowledge of learning, knowledge acquisition, data collection methods, their ethical limitations and problem solving techniques in product design.
- Knowledge of the historical periods of industrial design, its prominent designers and typical subjects.
- Knowledge of the basic rules of intellectual property management.
- Ability to apply the principles and methods of calculation and modelling of industrial product design literature.
- Understand and use online and printed literature in Hungarian and at least one foreign language typical of his/her field of specialisation.
- Know and use the language and special terms of his/her field of specialisation in Hungarian and at least one foreign language.
- Knowledge of the main analogies between natural and technical systems and their application in design.
- Ability to take into account the historical, cultural, socio-economic and industrial environment aspects in the process of industrial design and product development.

Literature:

1. Luz Del Carmen Vilchis Esquivel: Design Methodology: Theoretical Fundamentals. Authorhouse, 2014. ISBN13 (EAN): 9781463391782
2. https://elearning.uni-obuda.hu/ electronic notes and aids prepared by the instructor

Name of subject: **Integrated Product Design I.**	**NEPTUN-code:** RTXTT1EBNF	**Number of hours:** lec+gs+lab 0+0+3	**Credit:** 4 **Requirements:** term mark
Course coordinator: Prof. Márta Kisfaludy DLA	**Title:** professor	**Prerequisite:** Form Design I.	

Curriculum:

Knowledge of basic design principles and methods, the main factors that influence the design of a product or service, and the way in which it is used. Gathering information. Solving simple design problems by applying design principles in individual and group work. Modelling, presentation and evaluation of the product.
Designing a functional structure. Philosophy of creation. Model families. Design support using applied computing.
Systematic design progresses from simple problem statement to more complex projects. The focus of the course is on product development in team work, primarily through the creation of functional prototypes according to plans.

Detailed schedule of the course:

Educational week	Topics of lectures and practices
1.	Introduction to the semester. Topic of the semester.
2.	Gathering information. (Presentations.) System web.
3.	Analysis of information.
4.	Designing a function structure. Human factor. Moodboard.
5.	Developing a functional structure. Material, technology
6.	Philosophy of creation. (Design sketch)
7.	Positioning of concepts 1. Design basics
8.	Positioning of concepts 2.
9.	Proposing. (Design modelling) Prototyping 1.
10.	Proposing (Design modelling). Prototype construction 2
11.	Test, simulation.
12.	Mock-up/prototype construction.
13.	Mock-up/prototype construction. Preparation of documentation. Presentation (PPT). Evaluation.
14.	Resubmissions, evaluation.

Mid-term requirements:

Attendance at lectures and practices/labs:

Participation in the exercises 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).

Tests, minutes, reports, essays, etc.:

Week 2: presentations
Week 5: Moodboard upload (edited in A/3 format)
Week 12-13: presentations, uploading/submission of project documentation (A/3 poster). Assessment.
Week 14: Resubmissions, assessment

Method of obtaining a signature/mid-term mark:

The method of developing the mid-semester grade is based on the sum of the presentation and documentation evaluations. The final grade will be calculated based on the average of the mid-term evaluation of the assessment of the results of the mid-term examination.
The relevant rules of the TVSZ apply for making up the grade.

Professional competencies:

- Knowledge of basic design principles and methods, major manufacturing processes and operational procedures.
- Knowledge of the main materials used in product design, their production and conditions of use.
- Knowledge of teamwork ethics and methods.
- Ability to design and construct simple products, taking into account the constraints of production technology, expected costs and environmental impact.
- Ability to use three-dimensional computer-aided design systems to create virtual models of product concepts and products and to prepare technical documentation.
- Ability to create, test and verify real models and prototypes using direct digital manufacturing techniques based on traditional and 3D product models.
- Ability to acquire new knowledge by solving practical problems through experience.
- Ability to apply computational and modelling principles and methods from the industrial product design literature.
- Ability to take into account historical, cultural, socio-economic and industrial context aspects in the process of industrial design and product development.
- Ability to analyse design projects using design methods and to justify methodologically the workflows used.
- He/she will strive to ensure that his/her self-learning in industrial product and design engineering is continuous and consistent with his/her professional goals.
- He/she shall endeavour to ensure that his/her self-training in industrial product and design engineering is continuous and consistent with his/her professional objectives.
- Is open to transferring his/her knowledge to his/her colleagues.
- He/she is attentive to promoting the professional development of his/her subordinates and to managing and assisting them in this endeavour.
- Ensures that the principle of equal access is applied in problem solving.

Literature:

1. Bjarki Hallgrimsson: Prototyping and Modelmaking for Product Design : Second Edition. Laurence King Publishing, London, United Kingdom, 2019. ISBN13 9781786275110
2. Rob Thompson: Manufacturing Processes for Design Professionals. Thames & Hudson Ltd., London, United Kingdom, 2007. ISBN13 9780500513750
3. Rob Thompson: The Materials Sourcebook for Design Professionals. Thames & Hudson Ltd., London, United Kingdom, 2017. ISBN13 9780500518540
4. https://elearning.uni-obuda.hu/ electronic notes and aids prepared by the instructor

Name of subject: **Professional Environmental Protection (blended)**	**NEPTUN-code:** RTESK1EBNF	**Number of hours:** lec+gs+lab 1+1+0	**Credit:** 4 **Requirements:** term mark
Course coordinator: Gabriella Oroszlány Ph.D.	**Title:** assistant lecturer	**Prerequisite:** -	

Curriculum:

A description of the safety, health, environmental, quality and control requirements for the relevant professional sectors (textiles, clothing, leather, paper, plastics, etc.). Environmental impact of technologies, environmental problems in industrial production, their analysis and modern management. General rules and standards for waste management. Waste minimisation, recycling, re-use, disposal guidelines. Resource management.

Detailed schedule of the course:

Educational week	Topics of lectures and practices
1.	Lecture: 1: Environmental risk assessment of textile processes and basic concepts Practice: Raw materials in the textile industry, fibre recognition 1.
2.	L 2: Environmental risk assessment of textile processes and basic concepts P: Raw materials in the textile industry, fibre recognition 1.
3.	L 3: Technologies of major chemical stress: the finishing industry, including the chemistry of dyes P: Technical and non-woven textiles 1.
4.	L 4: Priority technologies for chemical stresses: the finishing industry, including dyeing and textile printing P: Technical and non-woven textiles 2.
5.	L 5: Textiles for environmental protection, textile-based structures P: Woven and knitted technical textiles 1.
6.	L 6: Voluntary certification schemes P: Woven and knitted technical textiles 2.
7.	Test 1.
8.	L 7: Life cycle analysis in textiles and clothing - LCA P: EU Textile Strategy
9.	L 8: Life cycle analysis in textiles and clothing - LCA P: EU Textile Strategy
10.	L 9: Ecological and energy footprint of the textile and clothing industry P: Feasibility of a circular economy in the textile industry
11.	L 10: Possibilities of reuse, recycling, destruction of textiles. Waste management. P: Feasibility of a circular economy in the textile industry
12.	L 11: Possibilities of reuse, recycling, destruction of textiles. Waste management. P: Feasibility of a circular economy in the textile industry
13.	L 12: Test 2. P: Student reports
14.	Evaluation of the semester

Mid-term requirements:

Attendance at lectures and practices/labs:

Participation in lectures and tutorials 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 for the semester).

Tests, minutes, reports, essays, etc.:

Exercise 1: Measurement report 1
Exercise 2: Measurement report 2
Exercise 3: Measurement report 3
Assignment 4: Report (individual development and electronic submission of the required assignment via Moodle and oral presentation in weeks 12 and 13)
2 online tests (in weeks 7 and 13).

Method of obtaining a signature/mid-term mark:

The requirement for obtaining a mid-year mark:
- Valid participation in the exercises,
- Individual or group assignments issued during the semester must be completed and handed in by the deadline. The deadline for submission of the mid-term assignments is set by the instructors. Assignments handed in after the deadline may only be handed in with a late fee, at the latest during the next teaching week.
- Completion of 2 online tests with a grade of at least satisfactory. A satisfactory test grade requires 50% of the maximum score.

The mid-year grade is based on the weighted average of the result of the final examination (50%) and the mid-year assignment (50%).
The relevant provisions of the current Study and Examination Regulations apply to the replacement of the mid-term mark.

Professional competencies:

- He/she is familiar with the expectations and requirements in the fields of occupational health and safety, fire protection, safety and health at work, and environmental protection.
- Knowledge of the basics, boundaries and requirements of marketing, management, environmental protection, quality assurance, information technology, legal and economic disciplines integrally related to product design.
- Understands and uses the online and printed literature in Hungarian and at least one foreign language.
- Knows and uses the language and specialised terminology of his/her field of specialisation in Hungarian and at least one foreign language.
- Adheres to and complies with the relevant health and safety, environmental protection, quality assurance and control requirements.

Literature:

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

Name of subject: **Visual Communication**	**NEPTUN-code:** RTXVK1EBNF	**Number of hours:** lec+gs+lab 0+0+3	**Credit:** 4 **Requirements:** term mark
Course coordinator: Daniella Koós Ph.D.	**Title:** associate professor	**Prerequisite:** Form Design I.	

Curriculum:

Communication through images. The forms of the visual conveyance of meaning.Creativity and visual thinking.
Based on freehand drawing, practicing the different graphical methods, genres, techniques, introducing the possibilities of graphic design.
The psychological context of vision. Basic concepts of aesthetics. The development of individual visual expressions. Style exercises.
The concept, content and form elements of corporate identity. Corporate identity and image. Corporate identity and corporate design. The main aspects of designing the information system. Designing corporate identity through group projects. Documentation.

Detailed schedule of the course:

Educational week	**Topics of lectures and practices**
1.	Description of the practical tasks for the semester.
2.	Emblem design I. / Current competition.
3.	Emblem design II. / Current competition.
4.	Information system design I (simple lettering and pictograms).
5.	Information system design II (simple inscriptions and pictograms)
6.	Information system design II (simple lettering and pictograms)
7.	Image-text relationship I (invitation design)
8.	Image-text relationship II (invitation design)
9.	Basic principles of portfolio design.
10.	Elements of content and form in portfolio design. Submission of exercises II and III.
11.	Colour preferences for the individual portfolio
12.	Colour preferences for the individual portfolio. Relationship between image and text.
13.	Completion of works.
14.	Submission and evaluation.

Mid-term requirements:

Attendance at lectures and practices/labs:

Participation in the exercises is compulsory, absence according to the TVSZ. Attendance at lectures is also compulsory, for the successful completion of the semester (exam) knowledge of the material presented in the lectures is required.

Tests, minutes, reports, essays, etc.:

Week 4: Assignment submission I.
Week 10. Assignment submission weeks II and III.
Week 14: Portfolio submission, assessment

Method of obtaining a signature/mid-term mark:

A mid-term mark is obtained by completing the mid-term assignments to the appropriate standard. A student who has an unsatisfactory mid-term mark at the end of the semester (due to lack or

quality of the required assignments) may attempt to obtain a mid-term mark once during the first two weeks of the examination period, in accordance with the regulations of the University of Óbuda's Study and Examination Regulations.

Professional competencies:

- Knowledge of the basic rules and technological limits of product shaping, content and form matching.
- Knowledge of the main analogies between natural and technical systems and their application in design.
- Ability to present product concepts and sketches in drawings using traditional hand techniques.

Literature:

1. https://elearning.uni-obuda.hu/ PPT-s and aids prepared by the instructor
2. Karen Cheng: Designing Type, Laurence King Publishing Ltd., London, 2020.ISBN10 0300111509, ISBN13 9780300111507
3. Josef Müller-Brockmann: Grid Systems in Graphic Design : "A Visual Communication Manual for Graphic Designers, Typographers and Three Dimensional Designers" ISBN10 3721201450, ISBN13 9783721201451
4. Philip B. Meggs: Meggs'History of Graphic Design. John Wiley& Sons Inc, 2016. ISBN13 (EAN): 9781118772058

Name of subject: **Ergonomics**	**NEPTUN-code:** RTXER1EBNF	**Number of hours:** lec+gs+lab 1+1+0	**Credit:** 4 **Requirements:** term mark
Course coordinator: Gabriella Oroszlány Ph.D.	**Title:** assistant lecturer	**Prerequisite:** Form Design I.	

Curriculum:

The concept, purpose and stages of development of ergonomics. The man - product and machine system. Anthropometric knowledge, use of anthropometric data in design
Physiological and psychological basis of ergonomics: vision, hearing, smell, touch, perception, memory.
Product ergonomics. The user environment. Design approaches. Product ergonomic quality. Ergonomic criteria.
Biomechanical principles, human force and torque.
Design for specific user groups (significantly different, limited). Product development process, user involvement in product development. Ergonomics of product use.
Ergonomics of product information, advertising, packaging, design of product documentation. Environmental ergonomics. Ergonomics of the working environment.

Detailed schedule of the course:

Educational week	**Topics of lectures and practices**
1.	Lecture 1- Introduction to ergonomics. Concept of ergonomics, main stages of its development and evolution - contact lesson with ONLINE learning material
2.	Practice 1 - Ergonomics independent research project. Clothing physiology.
3.	Lecture 2- Basics of anthropometry. Human characteristics to be considered in design. Application of anthropometric considerations in ergonomic design - contact hours with ONLINE course material
4.	Practice 2 - Fundamentals of Anthropometry. Ergonomics in design. Use of anthropometric measurement tools in practice. Anthropometry - assignment to be submitted
5.	Lecture 3 - Perception - Perception I. About perception and perception in general. Vision, pattern recognition - contact lesson with ONLINE course material
6.	Practice 3 - Ergonomics of the built environment (home) I. Classification and characteristics of our dwellings. Kitchen ergonomics, minimum required areas, movement and space use needs. Research assignment - report I.
7.	Lecture 4 - Perception - Perception II. Attention , memory - contact lesson with ONLINE learning material
8.	Practice 4 - Ergonomics of the built environment (home) II. Bathroom ergonomics, minimum required areas, movement and space use needs. Thematic research assignment - report II.
9.	Lecture 5 - Body composition and some physiological characteristics. The standing posture. The sitting posture, RSI-CTD. Eye problems in screen-based workplaces. Proposed layout of the seated computer workstation. Suggested layout alternatives - contact hours with ONLINE learning material
10.	Practice 5 - Ergonomics of the Built Environment (Home) III Ergonomics of anterooms, living rooms, bedrooms, minimum required areas, movement and space use needs. Thematic research - report III.
11.	Lecture 6 - Office ergonomics - computer workplace design

	Introduction to software ergonomics
12.	Practice 6 - Ergonomics of the built environment (home) IV Ergonomic design for specific user groups, minimum required areas, mobility and space usage needs. Thematic research task - report IV.
13.	ZH - ONLINE TEST - deadline for submission of individual or group assignments issued during the semester
14.	Supplementary ONLINE seminary test, supplementary assignments.

Mid-term requirements:

Attendance at lectures and practices/labs:

Participation in lectures and practices 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).

Tests, minutes, reports, essays, etc.:

13. week: Seminary test (ZH)
13. week: deadline for individual or group assignments handed in during the semester
14. week: Supplementary seminary test
14. week: Supplementary submission of assignments

Method of obtaining a signature/mid-term mark:

The requirement for obtaining a mid-year grade:
- Valid participation in laboratory exercises,
- individual or group assignments given during the semester must be completed and handed in by the deadline
- 1 final seminary test with a grade of at least satisfactory.

To obtain a satisfactory final grade, a minimum of 40% of the maximum mark must be achieved. The mid-year mark is based on the result of the final examination. In the case of an unsatisfactory final examination or incomplete or inadequate assignments, the mid-term mark will be insufficient. The relevant provisions of the current Study and Examination Regulations apply to the replacement of the mid-term mark and the assignments to be submitted.

Professional competencies:

- Knowledge of basic design principles and methods, major manufacturing processes and operational procedures.
- Knowledge of basic ergonomic and psychological methods, rules and standards for the design of industrial products.
- Ability to design simple products in terms of form and construction, taking into account the constraints of production technology, expected costs and environmental impact.
- Ensure equal access to the principle of equal opportunity in problem solving.

Bibliography:

1. Ergonomics In Product Design. Sendpoints Publishing Co., Ltd., Honkong, 2019. • ISBN13 9789887849377
2. Karwowski Waldemar: Handbook on Standards and Guidelines in Ergonomics and Human Factors. Taylor&Francis Inc., 2005. ISBN13 (EAN): 9780805841299
3. https://elearning.uni-obuda.hu/ electronic notes and aids prepared by the instructor

Name of subject: **Marketing and Trade**	**NEPTUN-code:** RTXMK1EBNF	**Number of hours:** lec+gs+lab 1+2+0	**Credit:** 4 **Requirements:** term mark
Course coordinator: Orsolya Nagy Szabó Ph.D.	**Title:** assistant lecturer	**Prerequisite:** -	

Curriculum:

The role, functions and structure of trade. Actors in distribution channels, classification of traders. Content of the foreign trade contract. Specificities of cultures in international trade. Principles of business ethics. Sustainable development, the concept of fair trade. Sales promotion methods. Online sales: webshop. Online marketing (ADWords, FB Twitter, etc.). Personal selling. Personality types. Consumer behaviour. Sales and negotiation techniques. Intellectual property. Concepts of inventions, patents, trademarks, know how, industrial design, licensing, franchising. Advertising objectives, pricing strategies. Basics of advertising psychology. Mechanism of action of advertising. Advertising messages in practice: historical and contemporary advertising. Exhibitions, trade fairs.

Detailed schedule of the course:

Educational week	**Topics of lectures and practices**
1.	Description of the half-yearly requirements. The concept of marketing and its changing role. Marketing mix. Discussion of assignments. The importance and role of opinion formers.
2.	Methods of market research. Rules for questionnaire design.
3.	The concept of market. Market segmentation. Target group. Positioning. Factors affecting the macro and micro environment of a company. "Opinion formers" assignment. Student reports.
4.	Historical and contemporary advertising. Basics of advertising psychology. Mechanism of action of advertising. Advertising message in practice. Main steps and aspects of advertising design. Discussion of advertising design exercise.
5.	Fundamentals of commerce. Offline and online commerce. Student presentation, market research I.
6.	Student presentation, market research II.
7.	Price-quality relationship in sales. Consumer behaviour, factors influencing the buyer. Analysis of domestic consumer behaviour. Analysis of different stores. Factors determining store choice.
8.	Student presentation, advertising design I.
9.	Basic concepts of product range, product policy choices. Understanding and importance of service marketing. Student presentation, advertising design II.
10.	Cultural specificities in international trade. Principles of business ethics.
11.	Intellectual property. Concepts of inventions, patents, trademarks, know how, industrial design, licensing, franchising. Brand and its components. Types of brands and combination of brand elements. Brand equity and brand loyalty.
12.	Brand name in the past and today. Brand name in the own professional field.
13.	Seminary test (ZH)
14.	Supplementary seminary test.

Mid-term requirements:

Attendance at lectures and practices/labs:

Participation in the exercises 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).
Attendance at lectures is governed by the TVSZ.

Tests, minutes, reports, essays, etc.:

Assignment submission: weeks 3, 5, 8
Seminary test (ZH) week 13.
Supplementary seminary test (ZH) week 14.
Active participation in the exercises is essential and will be evaluated.

Method of obtaining a signature/mid-term mark:

Mid-term work will be assessed on the basis of the completion of the tasks set during the semester. The average of the grades obtained for the completed assignments, together with the student's activity, will be used to calculate a part of the mid-semester grade, which will count for 40% of the mid-semester grade. 60% of the midterm grade is based on the result of the final examination. To obtain a midterm grade, all assignments assigned by the instructor must be completed to an acceptable (minimum satisfactory) level.
The relevant provisions of the current Study and Examination Regulations apply to the replacement of the mid-term mark.

Professional competencies:

- Knowledge of the basics, boundaries and requirements of marketing, management, environmental protection, quality assurance, information technology, law, economics, which are integrally related to product design.
- Understands and uses the online and printed literature in Hungarian and at least one foreign language.
- Knows and uses the language and specialised terminology of his/her field of specialisation in Hungarian and at least one foreign language.
- Market-, environment- and customer-oriented.

Literature:

1. Anthony G. Bennett: The Big Book of Marketing. McGraw-Hill Companies, 2010 ISBN: 978-0-07-162615-66.
2. https://elearning.uni-obuda.hu/ electronic notes and aids prepared by the instructor

Name of subject: **Projectmanagement (blended)**	**NEPTUN-code:** RMEPR1EBNF	**Number of hours:** lec+gs+lab 1+1+0	**Credit:** 4 **Requirement:** exam
Course coordinator: Áron Takács Ph.D.	**Title:** associate professor	**Prerequisite:** -	

Curriculum:

The topics of the course provide knowledge on how to implement projects with different objectives in a strategy-oriented way, how to manage uncertainties and risks, and how to find solutions to project-related problems using organisational-management, technical-technical and economic knowledge. In industrial and service activities, in the competitive sector, each task is solved by means of a specific design and implementation, in which a new product has to be produced within a given budget and within a given deadline, using finite resources (building a facility, designing a service, designing a product, etc.). Projects of this kind and similar activities require a new approach, the use of specific methods and techniques. In this sense, project management also represents the emergence of a new discipline.

Detailed schedule of the course:

Educational week	**Topics of lectures and practices**
1.	The concept of project, the tasks of project management. Initiating a project, planning, implementation, monitoring/supervision, closure.
2.	Routines, improvisation and the project. Starting a project. Forming the project team. Project management phases. Goal setting, project planning.
3.	Project planning tools: stakeholder analysis, logical framework matrix, work breakdown structure, responsibility matrix, time planning, resource planning.
4.	System of processes, aspects of time planning GANTT.
5.	Stochastic mesh design. Risk assessment of time planning. Cost planning. Quantification of resources, time valuation, cash flow.
6.	Cost monitoring. Modifying costs and their impact.
7.	Project quality criteria. Quantification of objectives, trade-offs between objectives.
8.	Quality planning in the project process.
9.	Monitoring quality characteristics. Corrective and preventive actions for quality.
10.	Project organisations. The organisational commitments required for different projects. Projects in practice, contracting, planning, documentation, monitoring, measurement, corrective actions.
11.	Projects in practice, contracting, planning, documentation, monitoring, measurement, corrections.
12.	Development of project methodology. Using completed projects for continuous improvement. Results and process orientation. Project cycle management Extreme project management, MS Project as a practical support tool.
13.	Seminary test (ZH). PMBOK Consultation
14.	Supplementary seminary test.

Mid-term requirements:

Attendance at lectures and practices/labs:

Participation at the exercises is compulsory, absence according to the TVSZ. Attendance at lectures is also compulsory, for the successful completion of the semester (exam) knowledge of the material presented in the lectures is required.

Tests, minutes, reports, essays, etc:

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Week 13: Writing one valid final test.
Week 14: Supplementary seminary test.

Method of obtaining a signature/mid-term mark:

Condition for obtaining a signature:
- Timely submission and acceptance of the assigned assignments
- The deadline for the submission of the assignment is the submission of the assignment by the due date and time.

The maximum mark for the final examination is 100, of which a minimum of 50 must be achieved. The relevant provisions of the current Study and Examination Regulations apply for the replacement of the signature.
Examination is written and take approximately 60 minutes.
The assessment is based on the percentage of marks obtained:
0 - 49% unsatisfactory,
50 - 62 % satisfactory
63 - 75 % moderate,
76 - 88 % good
89 - 100 % excellent

Professional competencies:

- Knowledge of the concepts of economics and environmental economics, project and environmental management, tools in the field of environmental protection.
- In the development and application of production and other technologies, the ability to cooperate with engineers developing and applying the technology in order to improve the technology from an environmental point of view.
- Their multidisciplinary knowledge enables them to participate creatively in engineering work and to adapt to constantly changing requirements
- Ability to identify shortcomings in the technologies used, process risks and take the initiative to mitigate them.
- Open to professional collaboration with professionals in other fields related to his/her profession.
- In the performance of his/her professional duties, he/she will also cooperate with qualified professionals from other disciplines (primarily economic and legal).
- He/she monitors and implements changes in legislation, technical, technological and administrative developments in the field.

Literature:

1. https://elearning.uni-obuda.hu/ electronic notes and aids prepared by the instructor
2. Project management guide (PMBOK® Guide) 5. Akadémiai Kiadó, Budapest, 2013, ISBN: 978 963 05 9426 4

Name of subject: **Form Design and Modelling I.**	**NEPTUN-code:** RTXFO1EBNF	**Number of hours:** lec+gs+lab 0+0+5	**Credit: 4** **Requirements:** term mark
Course coordinator: Dóra Papp-Vid DLA	**Title:** associate professor	**Prerequisite:** Freehand Drawing I.	

Curriculum:

Developing a creative design approach to the design of industrial products, understanding the concept of design in design. Modelling studies help to understand the analogies between natural and technical systems and their application in design.
To learn about the properties of different types of materials, both discipline-specific and modelling materials, and to explore the possibilities of shaping them. Innovative experiments in the design of spatial forms.
Modular structures, connection laws. Proportion systems, dimensional and material properties, possibilities for further development of spatial structures in leather, paper, plastic and textile. Functionality and visual appearance.
Taxonomy of geometric and organic forms. Analysis of the laws of geometric and natural forms. The concept and uses of modelling. Development of a design engineering vision for the development of form through the representation of the basic shapes that make up geometric models, the study of their characteristics and properties. Analysis of organic shapes through the production of study drawings. Scale modelling of natural forms. Production of models from geometric shapes.

Detailed schedule of the course:

Educational week	**Topics of lectures and practices**
1.	Description of the tasks of the semester. (PPT). Introduction to course contents and requirements. Form and structure of study drawings.
2.	Modular structures from paper units I. Study drawing of organic forms I.
3.	Modular structures from paper units II. Study drawing of organic forms II.
4.	Modular structures from paper units III. Documentation. Study drawing in several views I.
5.	Modular structures made of paper strips I. Study drawing in several views II.
6.	Modular structures made of paper strips II. Structural study drawing simplified form
7.	Modular structures made of paper strips (triaxial) III. Documentation. Modelling with plasticine I.
8.	Surface design I. Modelling with plasticine II.
9.	Surface design II. Modelling with paper I.
10.	Surface design III. Modelling with paper II.
11.	Relationship between letter and form I. Submission. Monochrome form abstraction
12.	Relationship between letter and form I. Two-color form abstraction
13.	Working on still missing tasks. Submission of documentation (PPT) for semester work.

14.	Evaluation.

Mid-term requirements:

Attendance at lectures and practices/labs:

Participation in the exercises is compulsory, absence according to the TVSZ.

Tests, minutes, reports, essays, etc.:

Week 4: Modular structure I. Documentation
Week 7: Modular structure II. Documentation
Week 11: Submission of surface design models
Week 13: Documentation of modelling
Week 14: Supplementary submissions and evaluation

Method of obtaining a signature/mid-term mark:

A mid-year mark is awarded to students who complete the attendance rate specified in the TVSZ and the assignments required in the exercises at the appropriate level.
The mid-semester grade is calculated by summing up the assessments of the work submitted and the documentation of the assignments. Substitutions will be made in accordance with the relevant rules of the TVSZ.

Professional competencies:

- Knowledge of basic design principles and methods, major manufacturing processes and operational procedures.
- Knowledge of the main raw materials used in product design, their production and conditions of use.
- Knowledge of the main analogies between natural and technical systems and their application in design.
- Ability to translate solutions developed in nature into engineering practice.
- Knowledge of basic design concepts and the principles of their dimensioning.
- Knowledge of the basic rules and technological constraints of product design, content and form.
- Ability to design simple products in terms of form and construction, taking into account technological constraints, expected costs and environmental impact.
- He/she will endeavour to keep his/her self-training in industrial product and design engineering continuous and in line with his/her professional goals.

Literature:

1. https://elearning.uni-obuda.hu/ PPT-s and aids prepared by the instructor
2. J. Robert Rossman , Mathew D. Duerden: Designing Experiences. Columbia University Press, New York, United States, 2019. ISBN13 9780231191685
3. Paul Jackson: Folding Techniques for designers: From Sheet to Form. 2022. Quercus Publishing. ISBN10 1856697215, ISBN13 9781856697217
4. Paul Jackson: Cut and Fold Techniques for Pop-Up Designs. Laurence King Publishers, 2014. ISBN13 (EAN): 9781780673271

Name of subject: **Form Design and Modelling II.**	**NEPTUN-code:** RTXFO2EBNF	**Number of hours:** lec+gs+lab 0+0+3	**Credit:** 4 **Requirements:** term mark
Course coordinator: Dóra Papp-Vid DLA	**Title:** associate professor	**Prerequisite:** Form Design and Modelling I.	

Curriculum:

Developing a creative design approach to the design of industrial products, understanding the concept of design in design.
To learn about the properties of different types of materials, both trade-specific and modelling materials, and to experiment with their shaping possibilities.
Exploring and analysing technical, structural, functional and aesthetic solutions through innovative experiments in spatial form design. Bionics as a source of inspiration. The role of information exploration in the design process. The application of design principles in the design process. Product design: design principles, defining shape characteristics, aesthetic and technical interpretation and design of dimensions. Functional analysis.
Acquisition of the most important working concepts in the field for subsequent design tasks.

Detailed schedule of the course:

Educational week	**Topics of lectures and practices**
1.	Description of the two tasks of the semester. (PPT). Folding experiments.
2.	Analysis and rewriting of natural forms.
3.	Basic aspects of the design of spatial forms, experimentation of form formation possibilities.
4.	Organic-geometric shapes, shape transitions.
5.	Generating ideas. Form and function.
6.	Sequences of shapes, equilibrium ratio order - scale composition, function.
7.	Material-form-function-mass model.
8.	Modeling, technical documentation
9.	Modeling, design documentation.
10.	Mockup / prototype. Poster making, replacements. Evaluation.
11.	Cardboard format study with creative folding.
12.	Folding experiments. Monogram scaling for the given object.
13.	Prototype and documentation.
14.	Submissions, semester evaluation.

Mid-term requirements:

Attendance at lectures and practices/labs:

Participation in the exercises is compulsory, absence according to the TVSZ.

Tests, minutes, reports, essays, etc.:

Week 10: First assignment: submission of mock-up/prototype, design documentation and poster.
Week 14: Second assignment: evaluation of prototype and documentation, submissions. Evaluation.

Method of obtaining a signature/mid-term mark:

Completion of the semester is based on the timely, quantitative and qualitative completion of the required tasks. Assignments handed in after the deadline may only be handed in at the latest in the following week of classes, subject to a late fee! If a student does not have an accepted assignment in the subject by the due date, he/she will receive a signature refusal mark, which he/she may correct within the time limit specified in the Study and Examination Regulations.

Professional competencies:

- Knowledge of basic design principles and methods, major manufacturing processes and operational procedures.
- Knowledge of the main raw materials used in product design, their production and conditions of use.
- Knowledge of basic construction designs and their sizing principles.
- Knowledge of the basic rules and technological limits of product shaping, content and form matching.
- Ability to design simple products in terms of form and construction, taking into account technological constraints, expected costs and environmental impact.
- Ability to translate solutions developed in nature into technical practice.
- He/she will endeavour to pursue self-training in industrial product and design engineering on an ongoing basis and in line with his/her professional goals.

Literature:

1. https://elearning.uni-obuda.hu/ PPT-s and aids prepared by the instructor
2. J. Robert Rossman , Mathew D. Duerden: Designing Experiences. Columbia University Press, New York, United States, 2019. ISBN13 9780231191685
3. Paul Jackson: Folding Techniques for designers: From Sheet to Form. 2022. Quercus Publishing. ISBN10 1856697215, ISBN13 9781856697217
4. Paul Jackson: Cut and Fold Techniques for Pop-Up Designs. Laurence King Publishers, 2014. ISBN13 (EAN): 9781780673271
5. Kapsali Veronika: Thames &Hudson, London, 2021. Biomimetics for Designers. ISBN13 (EAN): 9780500296387

Name of subject: **Freehand drawing I.**	**NEPTUN-code:** RTXRA1EBNF	**Number of hours:** lec+gs+lab 0+0+3	**Credit:** 4 **Requirements:** term mark
Tantárgyfelelős: Edit Csanák DLA	**Title:** associate professor	**Prerequisite:** -	

Curriculum:

Freehand modes of representation with traditional manual techniques. Analysis and representation of the structural relationships between geometric objects. Relationship between the subject and the background/space.
Understanding the principles of artistic representation. Conditions of composition design. Geometric perspective view of the body. Light - shadow, linear and tonal drawings.
Drapery - and object representation with various techniques. Color compositions and color harmonies of still life.

Detailed schedule of the course:

Educational week	**Topics of lectures and practices/labs**
1.	Description of semester topics and requirements. The role of freehand drawing in design - Concepts, genres, areas of expertise
2.	Exercise on objects and composition I: Geometric bodies, perspective (pencil)
3.	Exercise on objects and composition II: Geometric bodies, perspective (pencil)
4.	Drapery Study I: Drapery hung at 1 point (pencil)
5.	Object composition exercise III: Geometric bodies with drapery (pencil)
6.	Geometric bodies with drapery - Coloured pencil
7.	Drapery study II: Drapery study (painting)
8.	Still life with color technique - Painting I: watercolor, acrylic, tempera
9.	Still life with color technique - Painting II: watercolor, acrylic, tempera
10.	Object and color composition exercise I (stylization)
11.	Object and color composition exercise II (stylization)
12.	Completion of drawings
13.	Completion of drawings, preparation of assessment
14.	Evaluation

Mid-term requirements:

Attendance at lectures and practices/labs

Attendance at the exercises is mandatory. The number of absences is maximized by the provisions of the Óbuda University Study and Examination Regulations.

Seminary tests, reports, essays, etc.

Evaluation is based on the submission of selected thematic works.

Method of obtaining a signature/mid-term mark

The condition for obtaining the practice mark is participation within the framework regulated by the TVSZ, as well as submitting the works specified (above) in the Moodle system on time, in evaluable quality. A student may attempt to obtain the supplementary semester mark once per semester, in the first two weeks of the examination period, following the Study and Examination Regulations of the University of Óbuda.

Professional competencies:

- Knowledge of the basic rules and technological limits of product shaping, content and form matching.
- Knowledge of the main analogies between natural and technical systems and their application in design.
- Ability to present product concepts and sketches in drawings using traditional hand techniques.

Bibliography:

1. How to Draw: Drawing and Sketching Objects and Environments from Your Imagination
2. Stephanie Travis: Sketching for Architecture and Interior Design. Laurence King Publishing, 2015. ISBN-13 978-1780675923
3. https://elearning.uni-obuda.hu/ PPT-s and aids prepared by the instructor
4. Stan Smith: Anatomy, Perspective and Composition for the Artist, Dover Publications Inc., 2014. EAN**:** 9780486492995

Name of subject: **Freehand Drawing II.**	**NEPTUN-code:** RTXRA2EBNF	**Number of hours:** lec+gs+lab 0+0+3	**Credit:** 4 **Requirements:** term mark
Tantárgyfelelős: Edit Csanák DLA	**Title:** associate professor	**Prerequisite:** Freehand Drawing I.	

Curriculum:

Freehand modes of representation with traditional manual techniques.
Artistic anatomy of the human body proportions. The study of the structure of bones and musculoskeletal system.
Stylized figural group-compositions through creative practices. Spatial representations.Building and interior elements. Color compositions based on natural inspiration.

Detailed schedule of the course:

Educational week	**Topics of lectures and practices/labs.**
1.	Description of semester topics and requirements. Anatomy Studies I: Proportions, skeleton and muscles of the human body
2.	Anatomy Studies II: Study drawing of a skeleton (pencil)
3.	Anatomy Studies III: Study drawing of a skeleton (pencil)
4.	Anatomy Studies IV: The Skull (pencil)
5.	Anatomy Studies V: Muscles of the human body - Study drawings based on the aid (pencil)
6.	Sketching (pencil, ink pen, colour technique)
7.	Creative exercise I: Figural composition (colour technique)
8.	Creative exercise II: Figural composition (colour technique)
9.	Spatial representation I: The one-, two- and multiple-point perspective - Study drawing of inner space (pencil)
10.	Spatial representation II: Study drawing of inner space (pencil)
11.	Spatial representation III: Buildings and their environment (colour technique)
12.	Spatial representation IV: Buildings and their environment (colour technique)
13.	Completion of drawings, preparation of assessment
14.	Evaluation

Mid-term requirements:

Attendance at lectures and practices/labs

Participation at the exercises is mandatory. The number of absences is maximized by the provisions of the Óbuda University Study and Examination Regulations.

Seminary tests, reports, essays, etc.

Evaluation is based on the submission of selected thematic works.

The method of obtaining a signature/creating practice mark:

The condition for obtaining the practice mark is participation within the framework regulated by the TVSz, as well as submitting the works specified (above) in the Moodle system on time, in evaluable quality. A student may attempt to obtain the supplementary semester mark once per semester, in the first two weeks of the examination period, following the Study and Examination Regulations of the University of Óbuda.

Professional competencies:

- Knowledge of the basic rules and technological limits of product shaping, content and form matching.
- Knowledge of the main analogies between natural and technical systems and their application in design.
- Ability to present product concepts and sketches in drawings using traditional hand techniques.

Literature:

1. How to Draw: Drawing and Sketching Objects and Environments from Your Imagination
2. Stephanie Travis: Sketching for Architecture and Interior Design. Laurence King Publishing, 2015. ISBN-13 978-1780675923
3. https://elearning.uni-obuda.hu/ PPT-s and aids prepared by the instructor

PRODUCT DESIGN SPECIALIZATION
(INTERIOR-TEXTILE, FASHION-ACCESSORIES)

Name of subject: **Integrated Product Design II. (Interior and Fashion)**	**NEPTUN-code:** RTWTT2EBNF	**Number of hours:** lec+gs+lab 0+0+4	**Credit:** 5 **Requirements:** term mark
Course coordinator: Prof. Márta Kisfaludy DLA	**Title:** professor	**Prerequisite:** Integrated Product Design I.	

Curriculum:

Consumer needs, survey of habits and market participants, analysis and feedback into planning. By endorsing design principles, solution of simple design tasks individually andin group work. Product modeling, presentation and evaluation.
Colour and form, colour and ergonomics, colour harmonies, colour dynamics design. The cooperation of designers and manufacturers. The cost factors of designing.
The criteria of product features with individual, series and mass products as well as production management. Design for manufacturability, standardization of types (standardization), designing collections, model families. Supporting design with applied computer technology.
System design ranges from the suggestion of simple problems to more complicatedprojects.
The course focuses on product development in team work primarily by helping the preparation of functional prototypes according to the plans.
Redesign of a common place taking into account the specific characteristics of particular community areas. Coordination of materials, technology and style.
Designing uniforms and accessories, taking into account the specifics of a particular corporate image.

Detailed schedule of the course:

Educational week	**Topics of lectures and practices**
1.	Define the topic of the exercise. Sources of information to be collected.
2.	Analysis of information. Develop a functional structure. System network. Manual sketching.
3.	Standards. Environmental protection. Manual sketching.
4.	List of requirements. Selection of production technology. Manual and computer aided sketching.
5.	Human Factor I. Ergonomics. Manual and computer aided sketching.
6.	Human Factor II. Aesthetics. Manual and computer aided sketching.
7.	Final sketches.
8.	Philosophy of creation. Design principles.
9.	Positioning of concepts. Creating layouts.
10.	Selecting concepts based on requirements. Technical documentation.
11.	Design modelling. Test, simulation, prototyping I.
12.	Design modelling. Test, simulation, prototyping II.
13.	Prototyping. Poster submission.
14.	Presentation, evaluation of the semester.

Mid-term requirements:

Attendance at lectures and practices/labs

Participation in the exercises is compulsory, absence according to the TVSZ. Attendance at lectures is also compulsory, for the successful completion of the semester (exam) knowledge of the material presented in the lectures is required.

Tests, minutes, reports, essays, etc.

Week 10: Decision-making consultation
Week 13: Poster submission
Week 14: Submission of design documentation and models, evaluation

Method of obtaining a signature/mid-term mark

The mid-semester grade (20-30-50%) will be calculated from the sum of the presentation, documentation/poster and model evaluation. The percentage will change if the model is not completed due to viral situation. Assignments submitted after the deadline may be submitted no later than the following teaching week only with a late fee. If an assignment in the subject is not accepted for submission by the due date, it will be marked as unsigned and may be corrected within the time specified in the Study and Examination Regulations.
The final grade will be 40% satisfactory, 60% intermediate, 70% good, 80-100% excellent.
Make-ups are subject to the relevant rules of the General Regulations.

Professional competencies:

- Knowledge of basic design principles and methods, major manufacturing processes and operational procedures.
- Knowledge of the main materials used in product design, their production and conditions of use.
- Knowledge of the basic rules and technological constraints of product design, content and form.
- Knowledge of the most important practical working methods in the field.
- Knowledge of the ethics and methods of teamwork.
- Ability to design and construct simple products, taking into account the constraints of production technology, expected costs and environmental impact.
- Ability to use three-dimensional computer-aided design systems to create virtual models of product concepts and products and to prepare technical documentation.
- Ability to create, test and verify real models and prototypes using direct digital manufacturing technologies based on traditional and 3D product models.
- Ability to acquire new knowledge by solving practical problems through experience.
- Ability to apply computational and modelling principles and methods from the industrial product design literature.
- Ability to participate in and lead group work.
- Ability to initiate, set up and implement projects in team work, especially in a multidisciplinary environment.
- Ability to take into account historical, cultural, socio-economic and industrial context aspects in the process of industrial design and product development.
- Ability to analyse design projects using design methodologies and to methodologically justify the work processes used.
- He/she will strive to ensure that his/her self-study in industrial product and design engineering is continuous and consistent with his/her professional goals.
- He/she will endeavour to solve problems and make management decisions by listening to the opinions of his/her colleagues, preferably in cooperation.
- He/she is open to sharing his/her knowledge with his/her colleagues.
- He is attentive to promoting the professional development of his subordinates and to managing and helping them in their efforts in this direction.
- Ensures that the principle of equal access is applied in problem solving.

Literature:

1. William Lidwell, Kritina 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
2. Bjarki Hallgrimsson: 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. Rob Thompson: The Materials Sourcebook for Design Professionals. Thames & Hudson Ltd., London, United Kingdom, 2017. ISBN13 9780500518540
5. Donald A. Norman: The Design of Everyday Things. Basic Books, New York, United States, 2013. ISBN13 9780465050659
6. https://elearning.uni-obuda.hu/ PPT-s and aids prepared by the instructor

Name of subject: **Integrated Product Design III. (Interior and Fashion)**	**NEPTUN-code:** RTWTT3EBNF	**Number of hours:** lec+gs+lab 0+0+4	**Credit:** 5 **Requirements:** term mark
Course coordinator: Prof. Márta Kisfaludy DLA	**Title:** professor	**Prerequisite:** Integrated product design II. (Interior and Fashion)	

Curriculum:

Ecological approach in product design. Recycling-reuse-redesign.
The integrated product design on the basis of socio-economic and technical aspects lays great emphasis on the unified and coordinated display of products and product groups in addition to the functional, market, long standing, safety and feasibility aspects.
The experiments of colour and design studies aim at the diverse presentation of product variants through a design project.
The implementation of product design and development projects is aided by the preparation of prototypes and technological model experiments.
The most optimal creation of aesthetic product appearance is assisted by the product construction knowledge and the current state of the art industrial background.
Solutions for profession-specific project tasks. Re-use / redesign for interior design,clothing and accessories. Design, use of materials, technology and style coordination.

Detailed schedule of the course:

Educational week	**Topics of lectures and practices**
1.	Defining the topic of the semester exercise. Team formation. Survey of the given interior.
2.	Analysis of information. Develop a functional structure. System network. Manual sketching.
3.	Standards. Environmental aspects.
4.	List of requirements.
5.	Human Factor I. Ergonomics. Individual task.
6.	Human Factor II. Aesthetics. Individual task.
7.	Developing the individual task.
8.	Philosophy of creation. Individual solutions.
9.	Selection of ideas based on the requirements. Joint suggestions.
10.	Positioning design principles.
11.	Design and technology, group solutions.
12.	Function and vision, group solutions.
13.	Prototype construction. Group work, poster.
14.	Presentation and evaluation of the semester.

Mid-term requirements:

Attendance at lectures and practices/labs

Participation in the exercises is compulsory, absence according to the TVSZ.

Tests, minutes, reports, essays, etc.

Week 4: Submission of the list of requirements
Week 9: Decision-making consultation
Week 13: Submission of poster, mock-up and individual prototype
Week 14: Joint presentation, evaluation

Method of obtaining a signature/mid-term mark

The method of developing the final grade: will be based on the sum of the presentation and documentation (75%) for the exercise and the prototype (25%) for the individual work. Grading: 20%-40% satisfactory, 60% average, 70% good, 80-100% excellen

Professional competencies:

- Knowledge of basic design principles and methods, as well as major productiontechnology procedures and operating processes.
- Knowledge of the most important basic materials applied in the special area of productdesign, their production and their application criteria.
- Knowledge of the fundamental rules and technological limitations of shaping products,of striking a harmony between content and form.
- Knowledge of the most important practical work techniques of their special field.
- Knowledge of the ethics and methods of team work.
- Able to design the form and construction of relatively simple products by taking into account the limits of production technology, the costs expected, and impacts on the environment.
- Able to perform the virtual modelling of product concepts and products using 3D computer-aided design systems as well as to produce their technical documentation.
- Able to produce, examine and test real models and prototypes using direct digital production technologies based on both traditional and 3D product models.
- Able to master new knowledge by solving practical problems empirically.
- Able to apply the calculation and modelling principles and methods of special literature related to industrial product design.
- Able to take part in and also to manage team work.
- Able to initiate, compile, and carry out projects in team work, primarily in a multidisciplinary environment.
- Able to take into account the aspects of the historical, cultural, socio-economic and industrial environment in the process of industrial design and product development.
- Able to analyze design projects by applying design methods and to give methodologicalreasons for the workflows applied.
- Efforts to make self-education in the special area of industrial product design a continuousprocess in line with professional objectives.
- Efforts to solve tasks and make management decisions by being aware of the opinions ofthe colleagues supervised, possibly in cooperation therewith.
- Open to transmitting own knowledge to colleagues.
- Taking care to promote subordinates' professional development, to manage and help suchendeavors.
- Taking care of ensuring equal access opportunities in problem solving.

Literature:

1. William McDonough, Michael Braungart: The Upcycle: Beyond Sustainability - Designing for Abundance, North Point Press, Berkeley, California, United States, 2013. ISBN10 0865477485, ISBN13 9780865477483
2. Silvia Barbero, Brunella Cozzo: Ecodesign. Umweltfreundliches für den Alltag. Published by h.f.ullmann, 2012. ISBN10 3833163070, ISBN13 9783833163074
3. Rob Thompson: The Materials Sourcebook for Design Professionals. Thames & Hudson Ltd., London, United Kingdom, 2017. ISBN13 9780500518540
4. Donald A. Norman: The Design of Everyday Things. Basic Books, New York, United States, 2013. ISBN13 9780465050659
5. Jane Penty: Product Design and Sustainability. Routledge, 2019. ISBN 9781351400848
6. https://elearning.uni-obuda.hu/ PPT-s and aids prepared by the instructor

Name of subject: **Interior and Fashion Design I.**	**NEPTUN-code:** RTWEO1EBNF	**Number of hours:** lec+gs+lab 2+0+3	**Credit:** 4 **Requirements:** term mark
Course coordinator: Éva Hottó Ph.D.	**Title:** assistant lecturer	**Prerequisite:** Form design II.	

Curriculum:

Interior and furniture history. Eras, styles, manufacturing technologies. Today's typical interior style.
The architectural elements of design documentation, construction, sizing.
Architectural engineering and lighting elements markings, signal systems. Show the fixtures computer engineering floor plan and space.
Construction design documentation. Style variations of a given living space in and full designdocumentation of one style.
Aspects of designing clothes, elements, combinations. The proportions of the garment.
Basic silhouettes.
Design according to article categories, creative shape experiments, drapery studies, basic wardrobe.
Article group design, types and typical design solutions. Drapery studies, creative form experiments, basic dress design. Systematization of leather goods. Types, functions and typical design solutions for leather goods. Development and presentation of tenders collections.

Detailed schedule of the course:

Educational week	**Topics of lectures and practices**
1.	Mid-term requirements and tasks. Identify trends and their role. Aspects of dress design. Silhouettes. Basic garments I. Function, innovation, tradition in interior and fashion design.
2.	Basic garments II. Modes of presentation: Markings, symbol systems. Display and representation of furniture and different objects in the interior.
3.	Typical styles in interior design I. Mediterranean and Scandinavian styles. Current trends and connections in the fields of interior and fashion design.
4.	Typical styles in interior design/fashion II. Marking and representation of architectural, mechanical and lighting elements and structures.
5.	Introduction to furniture and style. The importance of interior and furniture history. Elements, structure and dimensions of architectural design documentation. I.
6.	Ancient interiors, furniture history and costumes. Elements, construction and scale of architectural design documentation. II.
7.	Test 1.(ZH). Interior and furniture history of the Middle Ages and Gothic. Costumes of the period. Presentation of design documentation. Arranging the pictures of the collection work. Evaluation
8.	Decor and furniture during the Renaissance. Costumes of the period. Style exercise of interiors and costumes I.
9.	Baroque and rococo interior and furniture history. Costumes of the period. Style exercise of interiors and costumes II.
10.	Classicist and empire interior and furniture characteristics. Costumes of the period. Style exercise of interiors and costumes III.
11.	Interior and furniture: biedermeier, historicism, art nouveau. Design documentation I.
12.	"Palaces in Budapest". Presentation of the collection and analysis exercise. Preparation of the design documentation II.
13.	Test (ZH) 2."Palaces in Budapest" evaluation of the collection and analysis exercise. Presentation and submission of the design documentation.
14.	Supplementary seminary test. Evaluation.

Mid-term requirements:

Attendance at lectures and practices/labs

Participation in laboratory exercises 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).
In addition to the laboratory exercises, students have the opportunity to carry out tasks related to the course material in the framework of a "Free Workshop".

Tests, minutes, reports, essays, etc.

Weeks 7 and 13: Test (ZH.)
Week 13: "Palaces in Budapest", collection and analysis assignment
Presentation of design documentation and style sheets (Lab).
Submission of design documentation (Lab).
Week 14: Evaluation

Method of obtaining a signature/mid-term mark

To obtain a mid-semester grade, the successful completion of the final examination papers and the mid-semester assignments at the appropriate level (all assignments must be at least at the satisfactory level). To obtain a satisfactory final examination grade, 50% of the maximum mark must be achieved. 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: final papers 60%, mid-semester practical assignments 40%. An unsatisfactory mid-term mark may be corrected in accordance with the provisions of the TVSZ.

Professional competencies:

- Knowledge of basic construction designs and their dimensioning basics.
- Able to design the form and construction of relatively simple products by taking into account the limits of production technology, the costs expected, and impacts on the environment.
- Able to perform the virtual modelling of product concepts and products using 3D computer-aided design systems as well as to produce their technical documentation.
- Able to give reasons for the decisions related to the product designed, as well as to test
- them and support them by technical and standard investigation methods.

Literature:

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

Name of subject: **Interior and Fashion Design II.**	**NEPTUN-code:** RTWEO2EBNF	**Number of hours:** lec+gs+lab 2+0+3	**Credit:** 4 **Requirements:** exam
Course coordinator: Éva Hottó Ph.D.	**Title:** assistant lecturer	**Prerequisite:** Interior and Fashion Design I.	

Curriculum:

Simple and special fabric structures and their production. Pattern types, pattern and style. Color pattern design for striped and checkered fabrics

Textile printing and printing processes, production criteria of the samples. Possibilities for designing patterns, concept and techniques of report. Special color schemes (transfer printing, inkjet printing, etc.). Colorits, patterns, sample families on different surfaces, materials (tiles, concrete, paper, textiles, etc.). Effect of style and pattern in the interior. Computer aided pattern design.

Types of commercial garment trend collections, characteristics of their making.

Types, typical shapes and solutions of clothing and accessories made of leather and leather type materials. Leather decoration techniques. Typical shoe types. The language of profession and its special terms in Hungarian and foreign languages.

Detailed schedule of the course:

Educational week	**Topics of lectures and practices**
1.	Introduction. Historical overview of pattern designs in different periods and styles. Task assignment.
2.	Raporting. Colour separation, colouring.
3.	Typical styles of patterns in interior design/fashion I.
4.	Preparation of the pattern samples for the different production processes. Textile printing, printing techniques.
5.	Typical styles/patterns in interior design/fashion II.
6.	Tiling materials. Patterns on different surfaces (ceramics, glass, porcelain, concrete, etc.).
7.	Textile patterns and current trends. Technological patterns.
8.	Matching patterns, pattern families. Strategy, principles and role of collection design. Processing textile samples on computer. Display of patterns on textiles.
9.	Architectural Basics I. Types of materials and cladding used in buildings, types of windows and doors, their properties and possible uses.
10.	Architectural Basics II. Building engineering knowledge: Water, sewerage, heating, lighting, materials, fittings and their uses in buildings. The loft and communal spaces.
11.	Types and dimensions of anterooms, living rooms, kitchens, bedrooms and ancillary rooms. Product knowledge of common areas.
12.	Seminary test (ZH)
13.	Typical elements of folk cultures and their use in contemporary design.
14.	Supplementary seminary test. Evaluation.

Mid-term requirements:

Attendance at lectures and practices/labs

Attendance at lectures and tutorials is compulsory. Attendance of lectures, seminars and tutorials. Only students who arrive with the necessary equipment (as required by the e-learning system) for the exercise will be allowed to participate in each exercise.

Tests, minutes, reports, essays, etc.

Week 5: Submission of plans
Weeks 9-10: Exercise: completion and presentation of the plans for the sample family.
Week 12: Seminary test (ZH).
Week 13: In practice: presentation of computer designs.
Week 14: Supplementary ZH in lecture.

Method of obtaining a signature/mid-term mark

Signature is obtained by passing (50% to satisfactory) 1 final examination and completing the assignments set by the tutors with a minimum satisfactory level. Their practical work will be assessed in the form of a mark. An unsatisfactory final examination may be made up once. Only those who complete each of the tasks listed at a satisfactory level will be awarded a mark. The relevant provisions of the current Study and Examination Regulations apply to the replacement of the signature.
The examination will be oral, on topics drawn from the material of both semesters, at the intervals and with the possibility of make-ups prescribed by the TVSz.
The examination mark will include the result of the work done during the semester (70% examination mark - 30% mark for practical work).

Professional competencies:

- Knowledge of basic construction designs and their dimensioning basics.
- Able to design the form and construction of relatively simple products by taking into account the limits of production technology, the costs expected, and impacts on the environment.
- Able to perform the virtual modelling of product concepts and products using 3D computer-aided design systems as well as to produce their technical documentation.
- Able to give reasons for the decisions related to the product designed, as well as to test them and support them by technical and standard investigation methods.

Literature:

1. https://elearning.uni-obuda.hu/ PPT-s 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

Name of subject: **Technology of Specialization I.**	**NEPTUN-code:** RTWST1IBNF	**Number of hours:** lec+gs+lab 0+0+3	**Credit:** 4 **Requirements:** term mark
Course coordinator: Orsolya Nagy Szabó Ph.D.	**Title:** assistant lecturer	**Prerequisite:** Machines of Industrial Technologies I.	

Curriculum:

The purpose of the subject is the knowledge of the basic concepts of sewing technology used in the clothing industry (sewing, seam, stitch, types of stitches, types of seams, types of sewing). Requirements to be met by the sewing. Basic influencing factors of the sewing. General characteristics of the sewing threads and sewing machine needles. Acquisition of the skill of threading, setting and operating industrial sewing machines. Learning essential modes of technical presentation. Learning techniques, types of sewing, their practical application and implementation when making various textile –and leather products.
Knowing the requirements of health protection, occupational safety and environmental protection in the practical exercises.

Detailed schedule of the course:

Educational week	**Topics of lectures and practices**
1.	Work and fire safety education. Familiarisation with the most commonly used machines and equipment. Use of the industrial loopstitch machine.
2.	Familiarisation with and use of a three-thread sewing machine and industrial ironing equipment.
3.	Basics of technical illustration in the garment industry. Technological solutions. Making products from woven textiles 1.
4.	Technological solutions. Making woven textile products 2.
5.	Technological solutions. Making products from woven textiles 3.
6.	Technological solutions. Making products from woven textiles 4. Evaluation of completed works.
7.	Making textile manipulation 1.
8.	Making textile manipulation 2.
9.	Technological solutions. Making accessories for clothing 1.
10.	Technological solutions. Making accessories for clothing 2.
11.	Making a simple garment to own size 1.
12.	Making a simple garment to own size 2.
13.	Making a simple garment to own size 1.
14.	Evaluation of completed work

Mid-term requirements:

Attendance at lectures and practices/labs

Participation in the exercises is compulsory, absence according to the TVSZ. Attendance at lectures is also compulsory, for the successful completion of the semester (exam) knowledge of the material presented in the lectures is required.
In addition to the laboratory exercises, students have the opportunity to carry out tasks related to the curriculum in a "Free Workshop".

Tests, minutes, reports, essays, etc.

Works produced during the semester will be assessed twice, in weeks 6 and 14.

Method of obtaining a signature/mid-term mark

Mid-semester work will be assessed on the basis of the completion of the tasks set by the tutor during the semester. The average of the grades obtained for the completed tasks will be used to calculate the mid-semester grade. The mid-semester grade is awarded on the basis of the average of the results of the assignments given by the instructor.
The relevant provisions of the current Study and Examination Regulations apply to the replacement of the mid-term mark.

Professional competencies:

- Knowledge of basic design principles and methods, as well as major production technology procedures and operating processes.
- Knowledge of the most important basic materials applied in the special area of product design, their production and their application criteria.
- Knowledge of expectations and requirements prevailing in the areas of health and safety, fire protection and safety engineering as related to the relevant special field, as well as applicable environmental regulations.
- Knowledge of the most important practical work techniques of their special field.
- Able to explore the causes of failures and to select elimination operations.
- Able to resolve relatively simple health and safety tasks.
- Efforts to solve tasks and make management decisions by being aware of the opinions of the colleagues supervised, possibly in cooperation therewith.

Literature:

1. https://elearning.uni-obuda.hu/ electronic notes and aids prepared by the instructor
2. Adele Margolis: Complete Book of Tailoring. Echo Point Books & Media, 2019. EAN**:** 97816
3. Fallon Jules: Dressmaking: The Indispensable Guide. Firefly Books Ltd., 2017. ISBN13 (EAN): 9781770859388
4. David E. James: Upholstery: A Complete Course. Guild of Master Craftsman, 2017. ISBN-13: 9781784946555
5. Brown Amanda: Spruce: Step-by-step Guide to Upholstery and Design. Storey Books, 2013. SBN13 (EAN): 9781612121376
6. David Sowle, Ruth Dye: Complete Step-by-Step Upholstery.

Name of subject: **Technology of Specialization II.**	**NEPTUN-code:** RTWST2IBNF	**Number of hours:** lec+gs+lab 2+0+3	**Credit:** 4 **Requirements:** exam
Course coordinator: Orsolya Nagy Szabó Ph.D.	**Title:** assistant lecturer	**Prerequisite:** Technology of Specialization I.	

Curriculum:

The purpose of the course is to introduce the technologies of making home furnishings and clothing fabrics. Material manipulations, structures, textures. Technical preparation of production, calculation of the proportion of materials, laying rules, preparation of basic and consumable materials, technology of cutting. Sewing injuries.
Variations of technology decorations, special closing solutions, fabric edge processing. Spatial textile shapes. Sewing technology features in the production of different products.Leather manufacturing technology.
Basics of technology for upholstery of leather and skin type materials and upholstery fabrics.
During the exercises, carrying out a project assignment based on an inspiration and professional solutions to the technological details.
General criteria, conditions and requirements for making a garment product or accessory.

Detailed schedule of the course:

Educational week	**Topics of lectures and practices**
1.	Presentation of the topic and tasks for the semester. Assignment of a clothing design project. Processing and wearing properties of fibre materials. Possibilities of decorating textiles.
2.	Analysis of women's skirts. Making of a women's skirts I.
3.	The importance of technology. Process of manufacturing textile products. Making of a women's skirts II.
4.	Illustration methods, technological documentation. Garment design project assignment submission. Making a skirt for women III.
5.	Theoretical aspects of sewing technology. Women's skirt making IV. Evaluation of practical work. Evaluation of the project, preparation for the execution.
6.	Tayloring of textiles. Preparation and tailoring of a pattern for a selected garment.
7.	Wet heat treatment and gluing in the processing of textiles. Design and construction of the project.
8.	Leather production. Properties of hides and skins. Properties of artificial leathers. Implementation of the project 1.
9.	Areas of leather processing. Leather in interior design. Technological characteristics of leather processing. Machinery and equipment used in leather processing. Project task implementation 2.
10.	Products of the leather industry, their characteristics. Possibilities of decorating leather. Project task implementation 3.
11.	Types of bags. Different construction and technological solutions. Project task implementation 4.
12.	Classification of footwear. Completion of the project task, preparation of documentation. Preparation for the exhibition. Seminary test (ZH)
13.	Set up an exhibition of the half-year's work.
14.	Supplementary seminary test. Evaluation of completed works.

Mid-term requirements:

Attendance at lectures and practices/labs

Participation in the exercises is compulsory, absence according to the TVSZ. Attendance at lectures is also compulsory, for the successful completion of the semester (exam) knowledge of the material presented in the lectures is required.
In addition to the laboratory exercises, students have the opportunity to carry out tasks related to the curriculum in a "Free Workshop".

Tests, minutes, reports, essays, etc.

Week 4: Submission of a design brief
Week 5: Assessment of practical work
week 12: Seminary test (ZH)
Week 14: Supplementary seminary test. Assessment of project assignment.

Method of obtaining a signature/mid-term mark

The mark is obtained on the basis of the successful completion of the seminary test and the mid-term assignments to the appropriate standard. A satisfactory final examination grade requires 50% of the maximum mark. The deadline for the submission of mid-term assignments is the next practice. In the case that a student has received a signature denial at the end of the semester due to an unsatisfactory mid-term examination or assignment, the relevant provisions of the current Study and Examination Regulations apply for the replacement of the signature.
The semester ends with an oral examination.
Examination mark: 60% examination paper, 40% technological execution of the semester's work.

Professional competencies:

- Knowledge of basic design principles and methods, as well as major production technology procedures and operating processes.
- Knowledge of the most important basic materials applied in the special area of product design, their production and their application criteria.
- Knowledge of expectations and requirements prevailing in the areas of health and safety, fire protection and safety engineering as related to the relevant special field, as well as applicable environmental regulations.
- Knowledge of the most important practical work techniques of their special field.
- Able to explore the causes of failures and to select elimination operations.
- Able to resolve relatively simple health and safety tasks.
- Efforts to solve tasks and make management decisions by being aware of the opinions ofthe colleagues supervised, possibly in cooperation therewith.

Literature:

1. https://elearning.uni-obuda.hu/ electronic notes and aids prepared by the instructor
2. Adele Margolis: Complete Book of Tailoring. Echo Point Books & Media, 2019. EAN**:** 9781635610925
3. Fallon Jules: Dressmaking: The Indispensable Guide. Firefly Books Ltd., 2017. ISBN13 (EAN): 9781770859388
4. David E. James: Upholstery: A Complete Course. Guild of Master Craftsman, 2017. ISBN-13: 9781784946555
5. Brown Amanda: Spruce: Step-by-step Guide to Upholstery and Design. Storey Books, 2013. SBN13 (EAN): 9781612121376
6. David Sowle, Ruth Dye: Complete Step-by-Step Upholstery.

Name of subject: **Technology of Specialization III.**	**NEPTUN-code:** RTWST3IBNF	**Number of hours:** lec+gs+lab 1+0+3	**Credit:** 4 **Requirements:** term mark
Course coordinator: Orsolya Nagy Szabó Ph.D.	**Title:** assistant lecturer	**Prerequisite:** Technology of specialization II.	

Curriculum:

Special technologies for making home furnishing textiles and garment products. Basic concepts of gluing, technological process, factors influencing gluing, areas and methodsof gluing.
Basic concepts, technological process of wet heat treatment of textiles, factors influencing wet heat treatment.
Smart textiles in the interior. Innovative technologies.
Manufacturing technology of leatherwork industrial products, self-production of a leatherwork industrial product, and a clothing product.
Execution of home furnishing products and clothing models based on the project assignment, taking into account the material properties.

Detailed schedule of the course:

Educational week	**Topics of lectures and practices**
1.	Presentation of the topic and tasks for the semester. Professional wear. Practical application of leather decoration solutions I.
2.	Practical application of leather decoration solutions II.
3.	Special technological solutions I. Making of leather accessoires I.
4.	Making leather accessoires II.
5.	Special technological solutions II. Making backpacks from alternative materials I.
6.	Making backpacks from alternative materials II.
7.	Special technological solutions III. Making backpacks from alternative materials III.
8.	Making backpacks from alternative materials IV.
9.	Special design topics and technological solutions I. Making backpacks from alternative materials V.
10.	Making backpacks from alternative materials VI.
11.	Special design topics and technological solutions II. Textiles in the interior 1.
12.	Textiles in the interior 2.
13.	Preparation and submission of mid-term documentation. Upholstery of simple seating furniture.
14.	Supplementary seminary test.

Mid-term requirements:

Attendance at lectures and practices/labs

Participation in the exercises is compulsory, absence according to the TVSZ. Attendance at lectures is also compulsory, for the successful completion of the semester (exam) knowledge of the material presented in the lectures is required. Attendance at lectures is determined by the TVSZ.
In addition to the laboratory exercises, students have the opportunity to carry out tasks related to the curriculum in a "Free Workshop".

Tests, minutes, reports, essays, etc.

Mid-term practical assignments and assessment of documentation in week 14

Method of obtaining a signature/mid-term mark

Mid-term work is assessed on the basis of the completion of the tasks set by the lecturers during the semester. The average of the grades obtained for the assignments is the mid-semester grade, which requires the completion of all assignments assigned by the instructors at an acceptable (minimum satisfactory) level.
The deadline for the submission of mid-term assignments is the next exercise. In case
In addition to the laboratory exercises, students have the opportunity to carry out tasks related to the curriculum in a "Free Workshop". that a student has received a refusal to sign at the end of the term due to unsatisfactory assignments, the relevant provisions of the current Study and Examination Regulations apply to make up the work.

Professional competencies:

- Knowledge of basic design principles and methods, as well as major production technology procedures and operating processes.
- Knowledge of the most important basic materials applied in the special area of product design, their production and their application criteria.
- Knowledge of expectations and requirements prevailing in the areas of health and safety, fire protection and safety engineering as related to the relevant special field, as well as applicable environmental regulations.
- Knowledge of the most important practical work techniques of their special field.
- Able to explore the causes of failures and to select elimination operations.
- Able to resolve relatively simple health and safety tasks.
- Efforts to solve tasks and make management decisions by being aware of the opinions of the colleagues supervised, possibly in cooperation therewith.

Literature:

1. https://elearning.uni-obuda.hu/ electronic notes and aids prepared by the instructor
2. Adele Margolis: Complete Book of Tailoring. Echo Point Books & Media, 2019**.** EAN**:** 97816
3. Fallon Jules: Dressmaking: The Indispensable Guide. Firefly Books Ltd., 2017. ISBN13 (EAN): 9781770859388
4. David E. James: Upholstery: A Complete Course. Guild of Master Craftsman, 2017. ISBN-13: 9781784946555
5. Brown Amanda: Spruce: Step-by-step Guide to Upholstery and Design. Storey Books, 2013. SBN13 (EAN): 9781612121376
6. David Sowle, Ruth Dye: Complete Step-by-Step Upholstery.

Name of subject: **Knowledge of Textiles and Construction**	**NEPTUN-code:** RTWAK1EBNF	**Number of hours:** lec+gs+lab 2+0+3	**Credit:** 4 **Requirements:** term mark
Course coordinator: Judit Borsa Ph.D.	**Title:** professor	**Course coordinator:** Technology of Specialization I.	

Curriculum:

General characteristics and properties of raw materials used in the textile industry. Types of textiles, traditional and modern materials. The most common types and uses ofwoven, knitted and nonwoven fabrics

Functional and intelligent textiles.

Textile testings. Technical data, main characteristics and measurement of linear textiles, fabrics and knitted and crocheted fabrics. Investigation of the behavior of textiles against various stresses during use.

Basic knowledge of architecture, properties of materials used in buildings and their applications. Coverings, doors and windows, etc. Basics of building engineering. Dimensions / types / specifications of household and home equipments, lamps, lighting fixtures. Requirements for placement of interior materials (wall and floor tiles, parquet, wallpaper, etc.) and determination of quantity required.

Size research, size charts, size standards. The proportions of the human body in terms of clothing design. Body features and their effect on dress designs. Design solutions for various interior and clothing products. Modeling rules. Modeling methods for different component types.

Mock-up and innovative experiments for the project task.

Detailed schedule of the course:

Educational week	**Topics of lectures and practices**
1.	Body types, characteristics of the body. Measurement. Size characteristics of linear products.
2.	Size charts. Relationship between partitioning and construction. Construction of skirts using different methods.
3.	Basic garment construction and modelling solutions I. Construction of jeans.
4.	Basic garment construction and modelling solutions II. Construction of shirt blouse.
5.	Overview of fibre materials, decorative threads. Textile design. Fabric design, technical drawing of fabric, basic fabric constructions.
6.	Knowledge of natural and man-made fibres I. Fabric analysis, technical parameters of fabric (area density, thickness, fabric structure)
7.	Knowledge of natural and man-made fibres II. Analysis of sewing properties. Seam slip, seam strength, seam reinforcement.
8.	Textiles in home textiles, classification according to their uses. Materials of sleep culture, characteristics. Colour fastness tests, abrasion.
9.	Materials, characteristics of curtains, blinds. Materials and fittings of building services (water, drainage, heating, lighting, etc.) and possibilities of their uses.
10.	Materials and characteristics of carpets. Furniture upholstery. Floor coverings used in the catering industry: requirements for the installation of tiles, parquet flooring and calculation of quantities.
11.	Functional textiles, possibilities for designing function. The use of functional textiles in interior design and fashion. Requirements and calculation of quantities of wall coverings (tiles, wallpaper, paint, etc.) used in interior design.
12.	Seminary test (ZH)
13.	Determination of fibre composition. Labelling requirements. Definition of tensile strength, measurement options.

14.	Supplementary seminary test. Assessment.

Mid-term requirements:

Attendance at lectures and practices/labs

Participation in the exercises is compulsory, absence according to the TVSZ. Attendance at lectures is also compulsory, for the successful completion of the semester (exam) knowledge of the material presented in the lectures is required.
In addition to the laboratory exercises, students have the opportunity to carry out tasks related to the curriculum in a "Free Workshop".

Tests, minutes, reports, essays, etc.

Week 9: Assignment submission.
Week 12 (in lecture): Seminary test (ZH)
Week 14 (in lecture): Supplementary seminary test. Assessment.
Final deadline for other missing tasks and mid-year assignments in week 14.

Professional competencies:

- Knowledge of basic construction designs and their dimensioning basics.
- Knowledge of the most important practical work techniques of their special field.
- Able to design the form and construction of relatively simple products by taking into account the limits of production technology, the costs expected, and impacts on the environment.
- Able to master new knowledge by solving practical problems empirically.
- Motivated to familiarize with the latest development trends, solutions and innovations in their special field.

Literature:

1. https://elearning.uni-obuda.hu/ electronic notes and aids prepared by the instructor
2. Geoffrey West: Leatherwork - A Manual of Techniques. The Crowood Press Ltd. 2005. ISBN13 9781861267429
3. Gail P. Silverman: A Woven Book of Knowledge. University of Utah Press, 2008. ISBN0874809096
4. Adele Margolis: Complete Book of Tailoring. Echo Point Books & Media, 2019**.** EAN**:** 97816

Name of subject: **Design Visualization**	**NEPTUN-code:** RTWMT1IBNF	**Number of hours:** lec+gs+lab 0+0+2	**Credit:** 4 **Requirements:** term mark
Course coordinator: Edit Csanák DLA	**Title:** associate professor	**Előkövetelmény:** CAD/CAM II.	

Curriculum:

The purpose of the subject is the acquisition of the technique of design visualization, aidedwith computer programs, of processing-industrial products. Proportional construction methods of representing the products. Representation of different products in 2 –and 3 dimensional form. Material surfaces, structures and representation of patterns. Plane –andspace composition tasks. Computer-aided drawing presentation of product compositions and sketches. Virtual modelling of products and the preparation of their technical documentations. Drawings of products and their environment. Poster design with compositional principles in mind. Creative ways of displaying the interior layout and elements of space. Compilationof complex visual documentation for clothing collections.

Detailed schedule of the course:

Educational week	**Topics of lectures and practices**
1.	Discussion of mid-term tasks. Presentation of the software programs used to prepare the assignments
2.	Visualisation of multi-storey buildings, stairs, railings in ArchlineXP
3.	Creating materials and patterns in ArchlineXP
4.	Drawing documentation in ArchlineXP
5.	Creating visual plans with ArchlineXP. Submission of the task
6.	Design exercise I: Interiors
7.	Design exercise II: Determining patterns, colours and style
8.	Design exercise III and completion of assignments
9.	Introduction to InDesign
10.	Creating publications in InDesign I.
11.	Creating publications in InDesign II.
12.	Creating publications in InDesign III. Completing and submitting tasks
13.	Preparation of works for evaluation
14.	Mid-term evaluation

Mid-term requirements:

Attendance at lectures and practices/labs

Participation in the exercises is compulsory, absence according to the TVSZ.

Tests, minutes, reports, essays, etc.

Weeks 5-8-12: Submissions of assignments
Week 14: Assessment

Method of obtaining a signature/mid-term mark

In order to obtain a mid-year mark, students must participate in the exercises within the framework of the TVSz and submit their work in the Moodle system, with the number of pieces and on the topics specified, in a quality that can be assessed, by the deadline of the 14th week of the semester.

Professional competencies:

- Knowledge of the fundamental methods, rules and standards of ergonomy and psychologyas required for industrial product design.
- Able to present graphical product concepts and sketches using traditional manual techniques.
- Able to perform the virtual modelling of product concepts and products using 3D computer-aided design systems as well as to produce their technical documentation.
- Able to produce, examine and test real models and prototypes using direct digital
- production technologies based on both traditional and 3D product models.

Literature:

1. CAD books
2. https://elearning.uni-obuda.hu/ electronic notes and aids prepared by the instructor
3. Jon Yablonski: Laws of UX : Using Psychology to Design Better Products & Services. O'Reilly Media, Sebastopol, United States, 2020. ISBN13 9781492055310

Name of subject: **Projectwork**	**NEPTUN-code:** RTPPM1IBNF	**Number of hours:** lec+gs+lab 0+0+2	**Credit:** 4 **Requirements:** term mark
Course coordinator: Rita Kendrovics Boda Ph.D.	**Title:** associate professor	**Prerequisite:** Technology of Specialization III.	

Curriculum:

The purpose of the subject is that the students could use the theoretical knowledge, acquiredin the framework of the professional subjects, in practice-oriented projects. The 3-4 strong student groups (occasionally independently as well) learn the workflows – from the raisingof the problem through working out the basic ideas, to form experiments – in complex work. The students will get to know the appropriate distribution, time management of the work-phases. The will learn how to make a schedule and to co-ordinate the workflows. After collecting international information and analysing them, the students will design a coordinated exhibition interior in a specific style. They cooperate regularly with their consultants and the competent contact persons of professional organisations and firms. In written form and in presentations, too, the students will report their workflows and results and they will make their portfolios. When carrying out these tasks, in addition to their skillin solving problems, creating forms and in design as well, the adaptability and communication skill of the students will also develop, thus they can get a good background for joining the professional circles.

Detailed schedule of the course:

Educational week	**Topics of lectures and practices**
1.	Mid-year theme, description of tasks. Organisation of project groups.
2.	Drawing documentation of an interior detail. Consultation of project plans.
3.	Laser cutting technology, introduction to software (Corel Draw; Laser Cut 5.1), practical application. Technical limitations of Alpha Laser LCE-2. Technological solutions.
4.	Project design guidelines. Properties of fibreglass, plywood, plexiglas. Construction of connecting elements and joints. Production of curved surfaces. Execution of a practical task, production of a "production file". Technological solutions. Submission of project plans.
5.	Practical application of laser cutting. Making a model of an interior I.
6.	Practical application of laser cutting. Making a model of an interior II.
7.	Practical application of laser cutting. Making a model of an interior III.
8.	Implementation of the selected design in project groups I.
9.	Implementation of the selected design in project groups II.
10.	Implementation of the selected design in project groups III.
11.	Implementation of the selected design in project groups IV.
12.	Implementation of the selected design in project groups V. Presentation of the works
13.	Submission of mid-term works and documentation. Setting up an exhibition of the work done during the semester.
14.	Evaluation of the works produced.

Mid-term requirements:

Attendance at lectures and practices/labs

Participation in the exercises is compulsory, absence according to the TVSZ. In addition to the laboratory exercises, students have the opportunity to carry out tasks related to the curriculum in a "Free Workshop".

Tests, minutes, reports, essays, etc.

Week 4: Submission of project plans.
Week 7: Submission of the interior modell
Week 12: Presentation of works

Week 13: Submission of completed works and documentation for the project assignment.
Week 14: Evaluation of completed works and documentation.

Method of obtaining a signature/mid-term mark

Mid-semester work will be evaluated on the basis of the completion of the tasks set by the instructors during the semester. Planning (20%), active participation in the project (10%), sub-tasks (10%) and submitted project work and documentation (60%) will be assessed. A minimum satisfactory level of completion of all sub-tasks is required to obtain a mid-semester mark. The relevant provisions of the current Study and Examination Regulations apply to the replacement of the mid-term mark.

Professional competencies:

- Knowledge of basic design principles and methods, as well as major production technology procedures and operating processes.
- Knowledge of the most important basic materials applied in the special area of productdesign, their production and their application criteria.
- Knowledge of basic construction designs and their dimensioning basics.
- Knowledge of the learning, knowledge acquisition, and data collection methods of thespecial field of product design, their ethical limitations and problem solving techniques.
- Knowledge of the most important practical work techniques of their special field.
- Knowledge of the ethics and methods of team work.
- Able to design the form and construction of relatively simple products by taking intoaccount the limits of production technology, the costs expected, and impacts on the environment.
- Able to perform the virtual modelling of product concepts and products using 3D computer-aided design systems as well as to produce their technical documentation.
- Able to produce, examine and test real models and prototypes using direct digital production technologies based on both traditional and 3D product models.
- Able to master new knowledge by solving practical problems empirically.
- Understand and use characteristic online and printed references characteristic of theirspecial field, both in Hungarian and in at least one foreign language.
- Able to take part in and also to manage team work.
- Able to initiate, compile, and carry out projects in team work, primarily in a multidisciplinary environment.
- Able to take into account the aspects of the historical, cultural, socio-economic andindustrial environment in the process of industrial design and product development.
- Able to analyze design projects by applying design methods and to give methodologicalreasons for the workflows applied.
- Efforts to make self-education in the special area of industrial product design a continuous process in line with professional objectives.
- Efforts to solve tasks and make management decisions by being aware of the opinionsof the colleagues supervised, possibly in cooperation therewith.
- Open to transmitting own knowledge to colleagues.
- Taking care to promote subordinates' professional development, to manage and helpsuch endeavors.
- Taking care of ensuring equal access opportunities in problem solving.

Literature:

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

PACKAGING SPECIALISATION

Name of subject: **Integrated Product Design II. (packaging)**	**NEPTUN-code:** RTWIT2EBNF	**Number of hours:** lec+gs+lab 0+0+4	**Credit:** 5 **Requirements:** term mark
Course coordinator: Prof. Márta Kisfaludy DLA	**Title:** professor	**Prerequisite:** Integrated Product Design I. (Packaging)	

Curriculum:

Consumer needs, survey of habits and market participants, analysis and feedback into planning. By endorsing design principles, solution of simple design tasks individually andin group work. Product modeling, presentation and evaluation.

Colour and form, colour and ergonomics, colour harmonies, colour dynamics design. The cooperation of designers and manufacturers. The cost factors of designing.

The criteria of product features with individual, series and mass products as well as production management. Design for manufacturability, standardization of types (standardization), designing collections, model families. Supporting design with applied computer technology. Goods protection and the design methodology of its tools (packagedesign).

System design ranges from the suggestion of simple problems to more complicated projects.

The course focuses on product development in team work primarily by helping the preparation of functional prototypes according to the plans.

Industry specific design. Packaging design and packaging graphics with taking into account the specific characteristics of the product.

Detailed schedule of the course:

Educational week	Topics of lectures and practices
1.	Define the topic of the exercise. Sources of information to be collected.
2.	Analysis of information. System network. Timetable.
3.	Standards. Environmental aspects. Manual sketching.
4.	List of requirements. Functional structure design. Manual sketches.
5.	Human Factor I. Ergonomics. Manual sketching and computer aided design.
6.	Human Factor I. Aesthetics. Manual sketching and computer aided design.
7.	Philosophy of creation. Design principles.
8.	Positioning of concepts. Creating layouts.
9.	Final graphic and 3D sketches.
10.	Design selection based on requirements. Determination of production technology. Technical documentation.
11.	3D modelling. Testing, simulation, prototyping I.
12.	3D modelling. Testing, simulation, prototyping II.
13.	Finalisation of prototype. Submission of the poster.
14.	Presentation, evaluation of the semester.

Mid-term requirements:

Attendance at lectures and practices/labs

Participation in the exercises is compulsory, absence according to the TVSZ.

Tests, minutes, reports, essays, etc.

Week 10: Decision-making consultation
Week 13: Poster submission
Week 14: Submission of design documentation and models, evaluation.

Method of obtaining a signature/mid-term mark

The mid-semester grade is calculated by summing the presentation, documentation/poster and model evaluation (20-30-50%). Assignments submitted after the deadline may only be submitted no later than the following teaching week subject to a late fee. If an assignment is not accepted for submission by the due date, it will be marked as unsigned and may be corrected within the time limit specified in the Study and Examination Regulations.
The final grade will be 40% satisfactory, 60% intermediate, 70% good, 80-100% excellent.
Make-ups are subject to the relevant rules of the General Regulations.

Professional competencies:

- Knowledge of basic design principles and methods, as well as major production technology procedures and operating processes.
- Knowledge of the most important basic materials applied in the special area of product design, their production and their application criteria.
- Knowledge of the fundamental rules and technological limitations of shaping products, of striking a harmony between content and form.
- Knowledge of the most important practical work techniques of their special field.
- Knowledge of the ethics and methods of team work.
- Able to design the form and construction of relatively simple products by taking into account the limits of production technology, the costs expected, and impacts on the environment.
- Able to perform the virtual modelling of product concepts and products using 3D computer-aided design systems as well as to produce their technical documentation.
- Able to produce, examine and test real models and prototypes using direct digital production technologies based on both traditional and 3D product models.
- Able to master new knowledge by solving practical problems empirically.
- Able to apply the calculation and modelling principles and methods of special Bibliography: related to industrial product design.
- Able to take part in and also to manage team work.
- Able to initiate, compile, and carry out projects in team work, primarily in a multidisciplinary environment.
- Able to take into account the aspects of the historical, cultural, socio-economic and industrial environment in the process of industrial design and product development.
- Able to analyze design projects by applying design methods and to give methodological reasons for the workflows applied.
- Efforts to make self-education in the special area of industrial product design a continuous process in line with professional objectives.
- Efforts to solve tasks and make management decisions by being aware of the opinions of the colleagues supervised, possibly in cooperation therewith.
- Open to transmitting own knowledge to colleagues.
- Taking care to promote subordinates' professional development, to manage and help such endeavors.
- Taking care of ensuring equal access opportunities in problem solving.

Literature:

1. 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
2. Rob Thompson: Graphics and Packaging Production. Thames & Hudson Ltd., London, United Kingdom, 2012. ISBN13 9780500289884
3. Paul Jackson, Structural Packaging. Laurence King Publishers, 2012 ISBN10 1856697533, ISBN13 9781856697538
4. Bjarki Hallgrimsson: 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
6. Rob Thompson: The Materials Sourcebook for Design Professionals. Thames & Hudson Ltd., London, United Kingdom, 2017. ISBN13 9780500518540
7. https://elearning.uni-obuda.hu/ PPT-s and aids prepared by the instructor

Name of subject: **Integrated Product Design III. (Packaging)**	**NEPTUN-code:** RTWTC3EBNF	**Number of hours:** lec+gs+lab 0+0+4	**Credit:** 5 **Requirements:** term mark
Course coordinator: Prof. Márta Kisfaludy DLA	**Title:** professor	**Prerequisite:** Integrated Product Design II. (Packaging)	

Curriculum:

Ecological approach in product design. Recycling-reuse-redesign.
The integrated product design on the basis of socio-economic and technical aspects lays great emphasis on the unified and coordinated display of products and product groups in addition to the functional, market, long standing, safety and feasibility aspects.
The experiments of colour and design studies aim at the diverse presentation of product variants through a design project.
The implementation of product design and development projects is aided by the preparation of prototypes and technological model experiments.
The most optimal creation of aesthetic product appearance is assisted by the product construction knowledge and the current state of the art industrial background.
Profession-specific solutions of the project. Packaging of dry goods with eco-conscious approach.

Detailed schedule of the course:

Educational week	**Topics of lectures and practices**
1.	Issuing the task, interpreting it, brainstorming together
2.	Gathering information. Sustainability analysis. Concepts.
3.	Moodboard creation. Outline of basic ideas I. (design sketch)
4.	Sketching basic ideas II (design sketch)
5.	Narrowing down and further reflection on basic ideas (design sketch)
6.	Presentation of three developed basic ideas (design sketch) List of requirements.
7.	Making proposals on materials, forms, and graphics.
8.	3D modelling and branding.
9.	Development of the final design, preparation of technical documentation.
10.	Testing, simulation. Prototype construction I. Visual design.
11.	Prototype construction II.
12.	Presentations
13.	Presentation of the semester work and 70 x 100 cm documentation poster.
14.	Evaluation of the semester

Mid-term requirements:

Attendance at lectures and practices/labs
Participation in the exercises is compulsory, absence according to the TVSZ.

Tests, minutes, reports, essays, etc.
Week 12: Presentations
Week 13: Presentation of documentation, model(s) and 70 x 100 cm poster.
Week 14: Evaluation

Method of obtaining a signature/mid-term mark
The mid-year mark is calculated by summing up the presentation (20%) and the documentation for the practical (80%).
Marking: 20% - 40% satisfactory, 60% average, 70% good, 80-100% excellent

Professional competencies:

- Knowledge of basic design principles and methods, as well as major productiontechnology procedures and operating processes.
- Knowledge of the most important basic materials applied in the special area of productdesign, their production and their application criteria.
- Knowledge of the fundamental rules and technological limitations of shaping products,of striking a harmony between content and form.
- Knowledge of the most important practical work techniques of their special field.
- Knowledge of the ethics and methods of team work.
- Able to design the form and construction of relatively simple products by taking into account the limits of production technology, the costs expected, and impacts on the environment.
- Able to perform the virtual modelling of product concepts and products using 3D computer-aided design systems as well as to produce their technical documentation.
- Able to produce, examine and test real models and prototypes using direct digital production technologies based on both traditional and 3D product models.
- Able to master new knowledge by solving practical problems empirically.
- Able to apply the calculation and modelling principles and methods of special Bibliography: related to industrial product design.
- Able to take part in and also to manage team work.
- Able to initiate, compile, and carry out projects in team work, primarily in a multidisciplinary environment.
- Able to take into account the aspects of the historical, cultural, socio-economic andindustrial environment in the process of industrial design and product development.
- Able to analyze design projects by applying design methods and to give methodologicalreasons for the workflows applied.
- Efforts to make self-education in the special area of industrial product design a continuousprocess in line with professional objectives.
- Efforts to solve tasks and make management decisions by being aware of the opinions ofthe colleagues supervised, possibly in cooperation therewith.
- Open to transmitting own knowledge to colleagues.
- Taking care to promote subordinates' professional development, to manage and help suchendeavors.
- Taking care of ensuring equal access opportunities in problem solving.

Literature:

1. https://elearning.uni-obuda.hu/ electronic notes and aids prepared by the instructor
2. William McDonough, Michael Braungart: The Upcycle: Beyond Sustainability - Designing for Abundance, North Point Press, Berkeley, California, United States, 2013. ISBN10 0865477485, ISBN13 9780865477483
3. Silvia Barbero, Brunella Cozzo: Ecodesign. Umweltfreundliches für den Alltag. Published by h.f.ullmann, 2012. ISBN10 3833163070, ISBN13 9783833163074
4. Rob Thompson: The Materials Sourcebook for Design Professionals. Thames & Hudson Ltd., London, United Kingdom, 2017. ISBN13 9780500518540
5. Jane Penty: Product Design and Sustainability. Routledge, 2019. ISBN 9781351400848
6. Philip B. Meggs: Meggs'History of Graphic Design. John Wiley& Sons Inc, 2016. ISBN13 (EAN): 9781118772058
7. Timothy Samara: Design Elements - A Graphic Style Manual, Rockport Publishers, Gloucester, Massachusetts, 2007

Name of subject: **Packaging Design I.**	**NEPTUN-code:** RMWCT1EBNF	**Number of hours:** lec+gs+lab 2+0+3	**Credit:** 4 **Requirements:** term mark
Course coordinator: Róbert Németh DLA	**Title:** associate professor	**Prerequisite:** Form design II.	

Curriculum:

The types of design tasks. Specific aspects of the consumer and multipack packagingdesign. Process of technical design of the packaging. Requirements planning. Packaging forms, structures, types and sizing concepts of flexible types of paper, cardboard and corrugated cardboard sheets and their system planning.
Cargo unit formation.
The role of typography in packaging design.
Analysis and redesign of a commercially available product packaging with the use of corporate identity elements.

Detailed schedule of the course:

Educational week	**Topics of lectures and practices**
1.	Types of planning tasks. Basics of packaging design.
2.	Specific aspects of consumer and collective packaging design Introduction to ArtiosCAD software
3.	Regulatory requirements in design. ArtiosCAD settings
4.	Technical design process of packaging Drawing creation, use of raw materials
5.	Construction and types of flexible paper packaging Drawing tasks, use of tools
6.	Carton packaging shapes, their structure, types and sizing principles. Seminary test 1. (ZH). Drawing exercises, use of layering tools
7.	Structure, types and sizing principles of corrugated board boxes, their system design. Drawing exercises I.
8.	Unit load training Drawing exercises II.
9.	The role of typography in packaging design Use of sizing
10.	Individual design exercise: analysis and redesign of the packaging of a commercial product using the elements of the design - data collection Notes, marking of line types, use of reports
11.	Independent design task: - analysis, evaluation 3D visualisation
12.	independent design task: - construction design Exercise of tasks I.
13.	Independent design task: - graphic design. Seminary test 2. (ZH). Exercise of tasks II.
14.	Supplementary seminary test. Evaluation of the semester

Mid-term requirements:

Attendance at lectures and practices/labs
Participation in the exercises is compulsory, absence according to the TVSZ.

Tests, minutes, reports, essays, etc.
Weeks 6 and 13: Seminary tests
Week 14: Supplementary seminary test. Evaluation of the semester.

Method of obtaining a signature/mid-term mark
To obtain a mid-term grade, the two seminary tests and the independent assignment must each be passed with at least a satisfactory level. The grade is based on theoretical and practical performance.

Professional competencies:

- Knowledge of basic construction designs and their dimensioning basics.
- Able to design the form and construction of relatively simple products by taking into account the limits of production technology, the costs expected, and impacts on the environment.
- Able to perform the virtual modelling of product concepts and products using 3D computer-aided design systems as well as to produce their technical documentation.
- Able to give reasons for the decisions related to the product designed, as well as to test
- them and support them by technical and standard investigation methods.

Literature:

1. https://elearning.uni-obuda.hu/ electronic notes and aids prepared by the instructor
2. Giles Calver: What is packaging design?, RotoVision SA, 2004
3. Sarah Roncarelli, Candace Ellicott: Packaging Essentials - 100 design Principles for Creating
4. Packages, Rockport Publishers, 2010
5. Edwards, Klimchuk, Wallace & Werner: Really Good Packaging Explained, Crescent Hill Books, LLC., 2009
6. Steven Dupuis, John Silva: Package Design Workbook, Rockport Publishers, Inc., 2008
7. Paul Jackson: Structrural Packaging - Design Your Own Boxes and 3-D Forms, Laurence King Publishing Ltd, London, 2012
8. Marianne Rosner Klimchuk, Sandra A. Krasovec: Packaging Design - Successful Product Branding from Concept to Shelf, Wiley and Sons, Hoboken, New Jersey, 2012
9. William Lidwell, Gerry Manacsa: Deconstructing Product Design, Rockport Publishers, Beverly, Massachusetts, 2011

Name of subject: **Packaging Design II.**	**NEPTUN-code:** RMWCT2EBNF	**Number of hours:** lec+gs+lab 2+0+3	**Credit:** 4 **Requirements:** exam
Course coordinator: Róbert Németh DLA	**Title:** associate professor	**Prerequisite:** Packaging Design I.	

Curriculum:

Theoretical aspects of the packaging design: information content, advertising effect,possibilities of notation.
Acquiring of the basis of corrugated cardboard packaging design and practical applicationof it with ESKO Artios CAD program.
Box constructions (FEFCO).
The technical aspects of graphic design.
Printing and marking.
Shrink-labeling.
Documentation of the entire process through a specific design task.

Detailed schedule of the course:

Educational week	Topics of lectures and practices
1.	Theoretical issues in packaging design - information content 1. Introduction to typography 1. (understanding typography rules and systems and their application in the design process)
2.	Theoretical issues in packaging design - information content 2. Introduction to typography 2.
3.	Advertising impact of packaging Typographic basics
4.	Advertising graphic design of packaging Typographic knowledge
5.	Packaging design basics for the use of corrugated board Submission of completed assignments, evaluation.
6.	Box construction (FEFCO) Design of the assignment. Collection of materials: familiarisation with products already on the market and collection of images
7.	Theoretical basics of ESKO ArtiosCAD Creating a design for your own product (logo and image)
8.	Design on corrugated board in ArtiosCAD 1. Creating your own product design (creating the packaging design)
9.	Design on corrugated board in ArtiosCAD 2. Preparation of a design for your own product (visual design)
10.	Technical aspects of graphic design Designing the image of the own product (visual design)
11.	Printing and marking Designing of the own product (visual design)
12.	Shrink labelling Finalisation of product identity and packaging design, preparation of presentations
13.	Seminary test (ZH). Presentation of the design tasks
14.	Supplementary seminary test. Presentations. Evaluation of the semester

Mid-term requirements:

Attendance at lectures and practices/labs

Participation in the exercises is compulsory, absence according to the TVSZ.

Tests, minutes, reports, essays, etc.

Week 13: Seminary test on the theoretical material.
Week 13: Presentation of works made during the semester.
Week 14: Supplementary seminary test. Presentation and evaluation.

Method of obtaining a signature/mid-term mark

In order to obtain the signature, it is necessary to write the seminary test with at least a sufficient grade and to complete each of the task solutions to at least a sufficient level. The exam is written, and the grade is formed from the results of the exam (50%), the theoretical material (ZH 25%) and the practical tasks (25%).

Professional competencies:

- Knowledge of basic construction designs and their dimensioning basics.
- Able to design the form and construction of relatively simple products by taking into account the limits of production technology, the costs expected, and impacts on the environment.
- Able to perform the virtual modelling of product concepts and products using 3D computer-aided design systems as well as to produce their technical documentation.
- Able to give reasons for the decisions related to the product designed, as well as to test
- them and support them by technical and standard investigation methods.

Literature:

1. https://elearning.uni-obuda.hu/ electronic notes and aids prepared by the instructor
2. Giles Calver: What is packaging design?, RotoVision SA, 2004
3. Sarah Roncarelli, Candace Ellicott: Packaging Essentials - 100 design Principles for Creating Packages, Rockport Publishers, 2010
4. 4.Edwards, Klimchuk, Wallace & Werner: Really Good Packaging Explained, Crescent Hill Books, LLC., 2009
5. Steven Dupuis, John Silva: Package Design Workbook, Rockport Publishers, Inc., 2008
6. 6.Paul Jackson: Structrural Packaging - Design Your Own Boxes and 3-D Forms, Laurence King Publishing Ltd, London, 2012
7. Marianne Rosner Klimchuk, Sandra A. Krasovec: Packaging Design - Successful Product Branding from Concept to Shelf, Wiley and Sons, Hoboken, New Jersey, 2012
8. William Lidwell, Gerry Manacsa: Deconstructing Product Design, Rockport Publishers, Beverly, Massachusetts, 2011
9. Kristin Cullen: Design Elements - Typography Fundamentals, Rockport Publishers, Beverly, Massachusetts, 2012

Name of subject: **Packaging and Paper Technology I.**	**NEPTUN-code:** RMWPT1EBNF	**Number of hours:** lec+gs+lab 1+0+2	**Credit:** 4 **Requirement:** term mark
Course coordinator: László Koltai PhD	**Title:** associate professor	**Prerequisite:** -	

Curriculum:

History of paper and paper- and pulp production. Position and future of the paper industryin the Hungarian and world economy. Semi-finished products of paper industry. Pulps andrawmaterials: mechanical, thermo-mechanical semi-finished chemical cellulose pulp and bleaching. Pulp preparation. Fiber pulping, sizing, filling, refining, coloring. Papermachines and the type of its structural arrangement. Cardboard and sheet production.The presentation operations, calenders. Paper after-processing. Areas of paper processing.
Corrugated board production.

Detailed schedule of the course:

Educational week	**Topics of lectures and practices**
1.	History of papermaking
2.	The situation and future of the paper industry in Hungary and world economy. Pulps and raw materials in general
3.	Production of semi-finished paper products
4.	Paper industry statistics. Raw materials, mechanical and thermo-mechanical semi-finished products, pulp bleaching
5.	Mechanical, thermo-mechanical cellulose pulp. Preparation of paper pulp
6.	Semi-finished chemical cellulose pulp. Pulp dissolving, grinding, de-inking, filling, dyeing. Seminary test 1.(ZH).
7.	Paper machines and the types of their structural arrangement Bleaching.
8.	Paperboard and board production
9.	Packaging of paper
10.	Unwinding operations, calenders, sheet cutting
11.	Corrugated product manufacturing.
12.	Areas of paper prosessing
13.	Seminary test 2. (ZH) Submissons of reports from the excercises
14.	Supplementary seminary test. Mid-term evaluation

Mid-term requirements:

Attendance at lectures and practices/labs

Attendance at lectures and laboratory exercises is compulsory. The lectures and laboratory sessions are compulsory and knowledge of the material presented in the lectures is essential for successful completion of the semester. Absence according to the TVSZ.

Tests, minutes, reports, essays, etc.

Week 6: One seminary test from the lectures.
Week 13: One seminary test on the material from the practical work.
Week 13. Submissions of reports from the exercises.
Week 14: Supplementary seminary test. Evaluation

Method of obtaining a signature/mid-term mark

In order to obtain a mid-year mark, the completion of two seminary tests each at a satisfactory level and the submission of the protocols by the deadline are required.

Professional competencies:

- Knowledge of basic design principles and methods, as well as major production technology procedures and operating processes.
- Knowledge of the most important basic materials applied in the special area of product design, their production and their application criteria.
- Knowledge of expectations and requirements prevailing in the areas of health and safety, fire protection and safety engineering as related to the relevant special field, as well as applicable environmental regulations.
- Knowledge of the most important practical work techniques of their special field.
- Able to explore the causes of failures and to select elimination operations.
- Able to resolve relatively simple health and safety tasks.
- Efforts to solve tasks and make management decisions by being aware of the opinions of the colleagues supervised, possibly in cooperation therewith.

Literature:

1. Mark J. K.: Paper and Paperboard Packaging Technology 2005 by Blackwell Publishing Ltd.
2. Herbert Holik (Editor): Handbook of Paper and Board, ISBN: 978-3-527-33184-0
3. J. F. Hanlon: Handbook of Package Engineering, Third Edition ISBN-13: 978-1566763066
4. https://elearning.uni-obuda.hu/ electronic notes and aids prepared by the instructor

Name of subject: **Packaging and Paper Technology II.**	**NEPTUN-code:** RMWPT2EBNF	**Number of hours:** lec+gs+lab 2+0+3	**Credit:** 4 **Requirement:** exam
Course coordinator: László Koltai Ph.D.	**Title:** associate professor	**Prerequisite:** Packaging and Paper Technology I.	

Curriculum:

Fundamentals of packaging technology. The aim of packaging, functions, grouping of requirements. Packing agents. Paper-based, glass and plastic packaging materials. Packaging and logistics. Transport packaging, loading units. Packaging and environmentalprotection. Hungarian legislation, waste utilization. Consumer packaging as an advertisingmedium.

Detailed schedule of the course:

Educational week	**Topics of lectures and practices**
1.	Packaging technology basics
2.	History of packaging Purpose of packaging, functions, classification of uses
3.	Fundamentals of packaging technology Packaging knowledge - paper-based packaging
4.	The aim of packaging, functions, grouping of requirements Packaging knowledge - metal packaging
5.	Packing agents Packaging knowledge - glass packaging
6.	Plastics in packaging. Seminary test ZH.
7.	Plastic packaging materials
8.	Composite packaging materials
9.	Packaging and logistics
10.	Transport packaging, unit loads
11.	Packaging and environmental protection. Seminary test (ZH).
12.	Hungarian legislation, waste recovery
13.	Consumer packaging as an advertising medium. Seminary test (ZH)
14.	Supplementary seminary test. Evaluation

Mid-term requirements:

Attendance at lectures and practices/labs

Participation in the exercises is compulsory, absence according to the TVSZ. Attendance at lectures is also compulsory, for the successful completion of the semester (exam) knowledge of the material presented in the lectures is required.

Tests, minutes, reports, essays, etc.

Weeks 6 and 13: Two seminary tests based on material from lectures.
Week 11: One seminary test from the material of the practice.
Measurement records from the material of the exercises.
Week 14: Evaluation.

Method of obtaining a signature/mid-term mark

In order to obtain the signature, it is necessary to complete each of the three seminary tests at least to a sufficient level, as well as to prepare the minutes by the deadline. The exam mark is created

taking into account the written exam and the grade achieved during the semester.

Professional competencies:

- Knowledge of basic design principles and methods, as well as major production technology procedures and operating processes.
- Knowledge of the most important basic materials applied in the special area of product design, their production and their application criteria.
- Knowledge of expectations and requirements prevailing in the areas of health and safety, fire protection and safety engineering as related to the relevant special field, as well as applicable environmental regulations.
- Knowledge of the most important practical work techniques of their special field.
- Able to explore the causes of failures and to select elimination operations.
- Able to resolve relatively simple health and safety tasks.
- Efforts to solve tasks and make management decisions by being aware of the opinions of the colleagues supervised, possibly in cooperation therewith.

Literature:

1. Couzins-Scott Elizabeth: New Crafts Papermaking. Lorenz Books, 2014. ISBN13 (EAN): 978075482971
2. Husejin Durakovic: Technology of Extensible Paper Production. Planjax Graphic publishing house, 2010. ISBN:978-9958-34-079-6
3. Valentin I. Popa: Pulp Production and Processing. De Gruyter, 2020. EAN: 9783110658835
4. https://elearning.uni-obuda.hu/ electronic notes and aids prepared by the instructor

Name of subject: **Packaging and Paper Technology III.**	**NEPTUN-code:** RMWPT3EBNF	**Number of hours:** lec+gs+lab 1+0+3	**Credit:** 4 **Requirement:** term mark
Course coordinator: László Koltai Ph.D.	**Title:** associate professor	**Prerequisite:** Packaging and Paper Technology II.	

Curriculum:

Fundamentals of packaging technology. The aim of packaging, functions, grouping of requirements. Packing agents. Paper-based, glass and plastic packaging materials. Packaging and logistics. Transport packaging, loading units. Packaging and environmentalprotection. Hungarian legislation, waste utilization. Consumer packaging as an advertisingmedium.

Detailed schedule of the course:

Educational week	**Topics of lectures and practices**
1.	Packaging systems - vacuum and protective gas packaging
2.	Skin, blister, Easypack, Seepack packaging
3.	Form-fill-seal, Fill-seal, Aluseal, Alupack packaging
4.	Cardboard box systems by FEFCO
5.	Shrinkable, stretchable and tensioned packaging
6.	Bag in box and bag in drum systems. Aseptic packaging. Seminary test 1. (ZH)
7.	Bi-oriented packaging systems: BOPP films, stretch-blown hollow bodies (extrusion, injection molding)
8.	Wrap-around and trans-wrap systems
9.	Hungarian legislation, waste utilization. Technical and legal issues of consumer, collection and transport packaging
10.	Climatological knowledge. Corrosion protection
11.	Intelligent packagings Tools and methods of unit load training
12.	Mechanical tests of aluminum foil and plastic foils and their combinations
13.	Tests of water vapor permeability, gas permeability, linear size change, and shrinkage properties of packaging materials. Seminary test 2. (ZH)
14.	Supplementary seminary test. Evaluation.

Mid-term requirements:

Attendance at lectures and practices/labs

Participation in the exercises is compulsory, absence according to the TVSZ. Attendance at lectures is also compulsory, for the successful completion of the semester (exam) knowledge of the material presented in the lectures is required.

Tests, minutes, reports, essays, etc.

Week 6: Seminary test 1. based on the material of the lectures.
Week 13: Seminary test 2. based on the material of the exercises.
Measurement records from the material of the exercises.
Week 14: Supplementary seminary test. Evaluation

Method of obtaining a signature/mid-term mark

In order to obtain the mid-year pass, it is necessary to complete each of the two seminary tests at a sufficient level, as well as to prepare the reports by the deadline.

Professional competencies:

- Knowledge of basic design principles and methods, as well as major production technology procedures and operating processes.
- Knowledge of the most important basic materials applied in the special area of product design, their production and their application criteria.
- Knowledge of expectations and requirements prevailing in the areas of health and safety, fire protection and safety engineering as related to the relevant special field, as well as applicable environmental regulations.
- Knowledge of the most important practical work techniques of their special field.
- Able to explore the causes of failures and to select elimination operations.
- Able to resolve relatively simple health and safety tasks.
- Efforts to solve tasks and make management decisions by being aware of the opinions of the colleagues supervised, possibly in cooperation therewith.

Literature:

1. Marianne Rosner Klimchuk, Sandra A. Krasovec: Packaging Design - Successful Product Branding from Concept to Shelf, Wiley and Sons, Hoboken, New Jersey, 2012
2. Mark J. K.: Paper and Paperboard Packaging Technology 2005 by Blackwell Publishing Ltd.
3. Herbert Holik (Editor): Handbook of Paper and Board, ISBN: 978-3-527-33184-0
4. J. F. Hanlon: Handbook of Package Engineering, Third Edition ISBN-13: 978-1566763066
5. https://elearning.uni-obuda.hu/ electronic notes and aids prepared by the instructor

Name of subject: **Materials Science and Testing for Paper and Packaging**	**NEPTUN-code:** RMWPA1EBNF	**Number of hours:** lec+gs+lab 2+0+3	**Credit:** 4 **Requirements:** term mark
Course coordinator: László Koltai Ph.D.	**Title:** associate professor	**Prerequisite:** Packaging and Paper Technology I.	

Curriculum:

Paper types classification, and their main characteristics. Measurement theory, the reproducibility of measurements methods, evaluation of test results.
Introduction of general properties of the paper: production direction, transverse direction, sieve, the upper side, square weight, volume weight.
Understanding mechanical properties of paper, snatch, expansion, fracture, laceration, methods of measuring surface hardness. Knowledge of gluing properties, writeability, COBB, PLG, etc.
Introduce of advanced paper characteristics, flow, smoothness, etc.
Theory of measurement of optical properties, color measurement, whiteness measurement, opacity measurements.

Detailed schedule of the course:

Educational week	**Topics of lectures and practices**
1.	Grouping of paper types, their main characteristics 1.
2.	Grouping of paper types, their main characteristics 2.
3.	Measurement theory, methods of striving for the reproducibility of measurement results
4.	Evaluation of measurement results
5.	General properties of papers: production and transverse direction, screen and upper side, weight per square meter, volume, volume weight 1.
6.	General properties of papers: production and transverse direction, screen and upper side, weight per square meter, volume, volume weight 2. Seminary test 1. (ZH)
7.	Strength properties of papers: tearing, stretching, cracking, tearing, surface strength measurement methods 1.
8.	Strength properties of papers: tearing, stretching, cracking, tearing, surface strength measurement methods 2.
9.	Glueing properties: writability, COBB, PLG, etc. 1.
10.	Glueing properties: writability, COBB, PLG, etc. 2.
11.	Getting to know special paper properties, air permeability, smoothness, etc.
12.	Theory of measuring optical properties
13.	Color measurement, whiteness measurement, opacity measurement. Seminary test 2. (ZH)
14.	Supplementary seminary test. Semester evaluation.

Mid-term requirements:

Attendance at lectures and practices/labs

Participation in the exercises is compulsory, absence according to the TVSZ. Attendance at lectures is also compulsory, for the successful completion of the semester (exam) knowledge of the material presented in the lectures is required.

Tests, minutes, reports, essays, etc.

Week 6: Seminary test 1. based on the material of the lectures.
Week 13: Seminary test 2. based on the material of the exercises.
Measurement records from the material of the exercises.
Week 14: Supplementary seminary test. Evaluation

Method of obtaining a signature/mid-term mark

In order to obtain the mid-year pass, it is necessary to complete each of the two seminary tests at a sufficient level, as well as to prepare the reports by the deadline.

Professional competencies:

- Knowledge of the most important basic materials applied in the special area of product design, their production and their application criteria.
- Understand and use characteristic online and printed references characteristic of their special field, both in Hungarian and in at least one foreign language.
- Know and apply the terminology and special expressions of their professional field in Hungarian and in at least one foreign language.
- Adequate perseverance and endurance of monotony to perform practical operations.
- Able to give reasons for the decisions related to the product designed, as well as to test them and support them by technical and standard investigation methods.
- Efforts to comply with legal regulations and to take the ethical rules of engineering into account during work.
- Taking care of ensuring equal access opportunities in problem solving.

Literature:

1. https://elearning.uni-obuda.hu/ electronic notes and aids prepared by the instructor
2. Material Matters 04: Paper. Creative interpretations of common materials. Victionary, 2019. **I**SBN13 (EAN): 9789887903369
3. Lotte Reinecker, Peter Stray Jorgensen: The Good Paper: International edition. Samfundslitteratur, 2018**.** ISBN: 9788759331330

Name of subject: **ECO Frendly Packaging Materials**	**NEPTUN-code:** RMWKC1EBNF	**Number of hours:** lec+gs+lab 0+0+2	**Credit:** 4 **Requirements:** term mark
Course coordinator: Róbert Németh DLA	**Title:** associate professor	**Prerequisite:** Material Knowledge of Paper Packaging	

Curriculum:

Environmental design and packaging development in the XXI. century.
Trademarks of ECO friendly packagings.
The relevant environmental laws in packaging industry. Eco profiles of packagings. Biopolymer packaging materials. Degradation process of plastics. Types and environmental aspects of biodegradable polymer materials. Oxo-degradable polymer materials.
Recycling opportunities of glass, metal and textile packaging materials. Recycling and composting options for paper packaging. Intelligent packagings.

Detailed schedule of the course:

Educational week	**Topics of lectures and practices**
1.	XXI. century directions of environmental planning and development of packaging.
2.	Trademarks of environmentally friendly packaging
3.	Environmental protection legislation for packaging materials
4.	Eco-profile of packaging materials
5.	Biopolymer packaging materials
6.	Degradation process of polymer plastics. Seminary test 1. (ZH)
7.	Types of biodegradable polymer materials and environmental aspects of their development
8.	Oxo-degradable polymer materials
9.	Recycling options for glass and textile packaging
10.	Recycling options for metal packaging materials
11.	Possibilities of recycling plastics
12.	Recycling and composting possibilities of paper packaging
13.	Intelligent packaging. Seminary test 2. (ZH)
14.	Supplementary seminary test. Semester evaluation.

Mid-term requirements:

Attendance at lectures and practices/labs

Participation in the exercises is compulsory, absence according to the TVSZ.

Tests, minutes, reports, essays, etc

Weeks 6 and 13: Two seminary tests based on practice material.
Measurement records from the material of the exercises.
Week 14: Supplementary seminary test. Evaluation

Method of obtaining a signature/mid-term mark

In order to obtain the mid-year pass, it is necessary to complete each of the two seminary tests at a sufficient level, as well as to prepare the reports by the deadline.

Professional competencies:
– Knowledge of the most important basic materials applied in the special area of product design, their production and their application criteria. – Knowledge of the basics, limitations and requirements of the special fields of marketing, management, environment protection, quality assurance, information technology, law, and economics, intrinsically linked to the special area of product design. – Complying and ensuring compliance with the applicable requirement systems of security, health and safety, environment protection, quality assurance and inspection during work.
Literature:
1. https://elearning.uni-obuda.hu/ electronic notes and aids prepared by the instructor 2. Packaging Sustainability Tools Systems and Strategies for Innovative Package Design. John Wiley & Sons, 2009. ISBN: 9780470246696 3. Daniel Imhoff: Paper or Plastic Searching for Solutions to an Overpackaged World Watershed Media. Watershed Media Press, 2013. ISBN: 9780984630455

Name of subject: **Projectwork**	**NEPTUN-code:** RTPPM1EBNF	**Number of hours:** lec+gs+lab 0+0+2	**Credit:** 4 **Requirements:** term mark
Course coordinator: Rita Kendrovics Boda Ph.D.	**Title:** associate professor	**Prerequisite:** Packaging and Paper Technology III.	

Curriculum:

The purpose of the subject is that the students could use the theoretical knowledge, acquiredin the framework of the professional subjects, in practice-oriented projects. The 3-4 strong student groups (occasionally independently as well) learn the workflows – from the raisingof the problem through working out the basic ideas, to form experiments – in complex work. The students will get to know the appropriate distribution, time management of the work-phases. The will learn how to make a schedule and to co-ordinate the workflows. After collecting international information and analysing them, students will design products for a given group of firms. They cooperate regularly with their consultants and the competent contact persons of professional organisations and firms. In written form and in presentations, too, the students will report their workflows and results and they will maketheir portfolios. When carrying out these tasks, in addition to their skill in solving problems, creating forms and in design as well, the adaptability and communication skill of the students will also develop, thus they can get a good background for joining the professional circles.

Detailed schedule of the course:

Educational week	**Topics of lectures and practices**
1.	Discussion, formation of module groups using the concept map
2.	Formulation of the packaging problem, designation of goals and tasks
3.	Collection of information related to tasks
4.	Analysis, reporting and discussion of the information collected
5.	Brainstorming
6.	Individual ideas and sketches
7.	Group discussion of design plans
8.	Further development of drafts
9.	Examination of market, ergonomic, sustainability and legal aspects
10.	Joint design selection, mock-up creation
11.	Making a model/prototype, defining graphic elements
12.	Coordination of content of project reports, preparation of posters and ppt presentations
13.	Preparation of the final project presentation and exhibition.
14.	Final project presentation and exhibition. Evaluation.

Mid-term requirements:

Attendance at lectures and practices/labs

Participation in the exercises is compulsory, absence according to the TVSZ.

Tests, minutes, reports, essays, etc.

Weeks 13-14: Final project presentations Week 14: Exhibition arrangement, evaluation

Method of obtaining a signature/mid-term mark

The method of creating the mid-year grade:
- participation and activity in consultations, active participation in group work (10 points)
- documentation of the individual design work (20 points) and the group solution (25 points)
- presentation (45 points). Total 100 points (0-40 insufficient, 41-55 sufficient, 56-70 average, 71-85 good, 86-100 excellent).

Professional competencies:

- Knowledge of basic design principles and methods, as well as major production technology procedures and operating processes.
- Knowledge of the most important basic materials applied in the special area of product design, their production and their application criteria.
- Knowledge of basic construction designs and their dimensioning basics.
- Knowledge of the learning, knowledge acquisition, and data collection methods of the special field of product design, their ethical limitations and problem solving techniques.
- Knowledge of the most important practical work techniques of their special field.
- Knowledge of the ethics and methods of team work.
- Able to design the form and construction of relatively simple products by taking into account the limits of production technology, the costs expected, and impacts on the environment.
- Able to perform the virtual modelling of product concepts and products using 3D computer-aided design systems as well as to produce their technical documentation.
- Able to produce, examine and test real models and prototypes using direct digital production technologies based on both traditional and 3D product models.
- Able to master new knowledge by solving practical problems empirically.
- Understand and use characteristic online and printed references characteristic of their special field, both in Hungarian and in at least one foreign language.
- Able to take part in and also to manage team work.
- Able to initiate, compile, and carry out projects in team work, primarily in a multidisciplinary environment.
- Able to take into account the aspects of the historical, cultural, socio-economic and industrial environment in the process of industrial design and product development.
- Able to analyze design projects by applying design methods and to give methodological reasons for the workflows applied.
- Efforts to make self-education in the special area of industrial product design a continuous process in line with professional objectives.
- Efforts to solve tasks and make management decisions by being aware of the opinions of the colleagues supervised, possibly in cooperation therewith.
- Open to transmitting own knowledge to colleagues.
- Taking care to promote subordinates' professional development, to manage and help such endeavors.
- Taking care of ensuring equal access opportunities in problem solving.

Literature:

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

CRITERIA SUBJECTS

Title of the course: **Mentoring**	**NEPTUN-code:** RTIPTKEBNF	**Weekly teaching hours:** l+cw+lw 0+1+0	**Credit:** 0 **Exam type**: sign
Course leader: Lajos Norbert Berecz	**Position:** assistant lecturer	**Required preliminary knowledge:** -	

Curriculum:

The aim of the patronage teaching system is to help first-year students integrate into university education and support them in continuing their studies successfully. Ongoing contact with students helps to solve problems that arise during their studies. The aim of the sessions and discussions is to introduce the structure of the University, the main departments, the life of the student organisations and, above all, to help students find their way around the regulations.

Curriculum Description:

Week	Topics of practical works
1.	The purpose of the patronage system, basic differences between secondary school and university studies. Information on the Disability Equality Committee (assistance to those concerned, organisation of mentors).
2.	Getting to know each other: brief introduction of the students.
3.	Subjects and their requirements: overview of curricula content, importance of prerequisites (specifics of online and blended courses).
4.	Presentation of the faculty (RKK) and institute websites, information accessibility and tracking. Use of Moodle system, facilitating online learning, the importance of regularity.
5.	Consultation opportunities. Knowledge of learning methods, importance of meeting deadlines, repeat options.
6.	Presentation of students' study and research organisations (e.g. College of Integrated Sciences), Student mobility: Erasmus, IAESTE, IASEC, CC USA. Representatives of student organisations introduce their organisations.
7.	Visit to the university's surroundings, professional theme visits (e.g. exhibition, educational trail, labs).
8.	Current issues, preparation for final exams, the importance of peer support between students. University communication: drafting and sending letters and requests.
9.	Fee payment obligations, preparation for the necessary transfers, available scholarships, applications, other funding opportunities, invitation of a representative from the Study Office.
10.	Issues related to training, education, getting to know senior students.
11.	Opportunities for professional development outside the classroom (TDK, internships, project work) by inviting a member of the Library staff.
12.	The role and importance of student feedback about lecturers.
13.	How to register for exams, options. Summary of experiences and opinions.
14.	End-of-semester final meeting with senior students.

Mid-semester requirements:

Attendance:

Attendance at the meetings is compulsory.

Methods of qualification:

Attendance at the sessions is pre-requisite for the signature, absence in compliance with the Education and Examination Regulations - TVSZ.

Professional competencies:

- Know the relationship between individual, pair and group learning and the functioning of learning communities.
- Ability to participate in the management of a learning organisation in a supportive and guided way.

- Ability to independently develop a self-critical plan based on the knowledge required for a career,
- skills and attitudes, based on the learning outcomes of the occupation.
- He/she is ready to continuously seek supportive resources, to develop his/her professional responsibility and knowledge.
- Ability to work on a project basis, with a collaborative approach based on the division of labour.
- ability to work in a collaborative environment, sees individual contributions to shared success.
- Open to research-based problem solving.

Literature:

1. Education and Examination Regulations and other Regulations