

CURRICULUM KVEM12 VERSION KVEM12/18

Title of curriculum: Technology of Wood and Plastic

Code of curriculum's version: KVEM12/18

Valid from: 2018/2019

Educational aims of the curriculum: The programme aims to ensure competence in wood, plastics, textile and garment production technologies, relevant scientific research and development activities ,and solving industrial problems in the company.

The two main specializations (wood technology, technology of plastics and textiles) of the study programme is based on combining the profound theoretical courses with practically relevant problem based learning in technology courses and research projects that provide smooth transition from university studies to professional career.

The programme has been composed to prepare MSc level specialists who are able to take up high-level manager, chief engineer, technologist positions in many areas of international wood, plastics, textiles and other materials processing company or start their career in furniture, upholstery furniture or apparel industry or continue their studies at the PhD level.

Learning outcomes: A graduate:

- knows the materials used in wood, furniture, plastics, textiles, apparel industry, and their usage in production processes
- analyses, correlates and is able to use acquired broad-based knowledge (terms, study methods, test standards, technologies, processes and management) in the field of wood, plastics and textile technology
- has a systematic overview of broad-based knowledge on chosen specialty in general and specifically on chosen specialization (concepts, technologies, materials, research methods);
- knows current trends and actual problems of his/her specialty and has a general idea of the state of the art, as of the industry related to his/her specialty, both in Estonia and other countries;
- is able to work in a team and organise production;
- is able of choose and apply appropriate methods and technologies for solving specialty-specific problems, as well as estimating the possible consequences of solutions;
- knows basics of innovation, production, design, technology and project management knowledge in research work and in the company;
- knows the main technological processes related to his/her specialty and possibilities of sustainable development of these.

Specialization(s): wood technology, technology of plastics and textiles

Structure of the curriculum:

Specialization: wood technology

General studies module(s)	
Technnology entrepreneurship and management	18 ECTS credits
Core studies module(s)	
Materials studies	18 ECTS credits
Research and development, product development and innovative production	18 ECTS credits
Special studies module(s)	
Projects on Master Thesis topic	18 ECTS credits
Technologies of Wood and Furniture Products	24 ECTS credits

Free choice courses module(s)	
Free choice courses	6 ECTS credits
Graduation thesis	18 ECTS credits
TOTAL	120 ECTS credits

Specialization: technology of plastics and textiles

General studies module(s)	
Technnology entrepreneurship and management	18 ECTS credits
Core studies module(s)	
Materials studies	18 ECTS credits
Research and development, product development and innovative production	18 ECTS credits
Special studies module(s)	
Projects on Master Thesis topic	18 ECTS credits
Technology of Plastics ; Technology of Textiles and Garment Industry	24 ECTS credits
Free choice courses module(s)	
Free choice courses	6 ECTS credits
Graduation thesis	18 ECTS credits
TOTAL	120 ECTS credits

Conditions of completion of basic studies:

Conditions of graduation: A graduate shall have completed the full curriculum, attaining 120 ECTS points.
Requirements for Cum laude diploma:

- credit for the MSc thesis "5";
- average credit upon graduation 4.60 or higher, covering all exams, practical training and MSc thesis.

LIST OF COURSES ACCORDING TO CURRICULAR PARTS

	*	ECT S credi ts	Weekly hrs	Le-Pr-Exe r	Evaluation	Teach. sem	Std sch sem
General studies							
<i>Technmology entrepreneurship and management</i>							
<p>Goals: - To give an opportunity to obtain knowledge of the actual technology trends in the field of specialty, - application skills in project planning, analysis, implementation and control, - enable students to plan and/or go in practice through the entrepreneurship process to implement a technology based business idea and/or set up a technology enterprise (teamwork and interdisciplinary study), - to provide knowledge and practical skills on basics of strategic management as well as fundamentals of financial management, - to explain the nature and challenges of supply chain management on the levels of process planning, business model and supplier network management.</p>							
<p>Study results: Student will: - apply the knowledge in project planning, analysis and control in project implementation, - have an overview of problems in production in the field of specialty and have an idea of management and engineer's work in the industry, - estimate business opportunities in the area of technology in international business environment, - plan and justify the business plan of a technology based business idea, - understand the main functions of a company, and the essence of strategic management, - understand the principles of making investment decisions, is able to analyse an investment project, - be skilled to systematically analyse in project planning and management phases the practical supply chain environments and configuration principles and set supply chain priorities and development activities.</p>							
Compulsory courses: 12.00 ECTS credits							
EKX0410 - Project planning, analysis and control		6.00	4	2-0-2	P-F.Ass.	A	1
MMJ5280 - Technology Entrepreneurship		6.00	4	1-0-3	Gr.Ass.	A	3
Optional courses: at least 6.00 ECTS credits							
MMO5530 - Strategic and Financial Management		6.00	4	2-0-2	E	SP	2
MMK5260 - Supply Chain Management		6.00	4	2-0-2	E	ASP	3
Core studies							
<i>Materials studies</i>							
<p>Goals: To give an opportunity: - to obtain basic knowledge of materials' testing and analysis methods in general and possibilities of its application while studying properties of wood, plastic, textile and composite materials, - to obtain basic knowledge of micro and macro structure of wood, plastic, textile and composite materials and to understand its conjunctions with physical and technological properties, - to integrate the knowledge about material selection principles with its applications in the wood-, furniture-, plastics- or textile and garment industry.</p>							
<p>Study results: A student: - will consciously choose suitable testing and methods for analyzing and investigating different materials and processes, - while working in the wood-, furniture-, plastics- or textile and garment industry, will choose materials for production upon price and quality considerations.</p>							
Compulsory courses: 6.00 ECTS credits							
EKX0350 - Materials Testing Methods		6.00	4	1-2-1	E	SP	2

	*	ECTS credits	Weekly hrs	Le-Pr-Exer	Evaluation	Teach. sem	Std sch sem
Optional courses: at least 12.00 ECTS credits							
EKP0630 - Polymeric Materials: Synthesis and Properties		6.00	4	2-1-1	P-F.Ass.	ASP	1
EKT0020 - Modern Textile Materials		6.00	4	2-1-1	E	SP	2
EKW0400 - Wood Structure and Properties		6.00	4	3-1-0	E	A	1
EKW0450 - Wood-Polymer Composites		6.00	4	2-2-0	E	A	1
<i>Research and development, product development and innovative production</i>							
<p>Goals: To give opportunities for the student to obtain knowledge:</p> <ul style="list-style-type: none"> - of main industrial products and application technologies for making glued joints and finishing of wood, plastic and textile products, - about basics of using CAD programmes in solving engineering tasks, preparing technical drawings and using CAM program for parts manufacturing, - in modelling of products and processes by using engineering tools based on computer technologies, - about increasing production efficiency by using real time monitoring and control of the production equipment, - of the main principles of green chemistry and technology and main environmental problems in industry in Estonia and abroad, - of classical and advanced cellulose technologies, supplies for nanocellulose and its production methods. 							
<p>Study results: A student:</p> <ul style="list-style-type: none"> - will be able to select suitable commercially available products and industrial technologies for gluing and finishing of wooden, plastic and textile materials, - will obtain practical skills of using CAD programmes to develop CAD-related technical drawings and to apply acquired knowledge in using CAM technology for machining of parts with simple geometry, - has an overview in field of simulation and modelling technologies, - is able to design the zero-waste and zero-discharge industrial processes, - will gain knowledge in the field of advanced cellulose and nano-cellulose technology developments and its applications. 							
Compulsory courses: 12.00 ECTS credits							
EKW0440 - Industrial material gluing and finishing technologies		6.00	4	3-1-0	E	SP	2
EKX0560 - CAD/CAM Technology in Furniture, Plastics and Garment Industry		6.00	4	0-4-0	E	A	1
Optional courses: at least 6.00 ECTS credits							
EMC0360 - Cellulose Technologies		6.00	4	3-1-0	E	A	1
EMT0160 - Production Digitalization		6.00	4	1-3-0	E	SP	2
EMT0070 - Modelling and Testing of Products and Processes		6.00	4	2-2-0	E	SP	2
KAK8220 - Sustainable/cleaner Production		6.00	4	3-0-1	E	A	1

	*	ECTS credits	Weekly hrs	Le-Pr-Exer	Evaluation	Teach. sem	Std sch sem
Free choice courses							
<i>Free choice courses</i>							
Goals: For a student to have a possibility to select, according to his /her interests and personal qualities, subjects from different curricula.							
Study results: A student will: - have a thorough knowledge and practical skills proceeding from his /her interests and personal qualities; - have a broad-minded view on and experience in solving problems related to his/her specialty.							
Graduation thesis							
<i>Master thesis</i>							
Goals: For a student to acquire a profound knowledge and solid skills of practical work by means of solving given technological or scientific problems related to his/her specialty. To create a better understanding of the importance of the problems solved in the framework of the thesis for a real working environment either in a production enterprise or in scientific research.							
Study results: A student will: - have a profound knowledge and practical skills in order to solve particular technological or scientific problems related to his/her specialty; - have a solid theoretical knowledge and problem solving skills in a real working environment.							
Special studies modules: wood technology							
<i>Projects on Master Thesis topic</i>							
Goals: For a student to acquire a profound knowledge and solid skills by project based learning connected with master thesis topic. For students to acquire practical skills of independent activity both in a scientific research laboratory and an enterprise processing wood, plastics or textiles producing wood products or furniture (depending on the Master thesis topic) under conditions of sustainable and environment-friendly production. To develop the capability of working in a team and solving problems independently, both in an enterprise and in an academic environment. To develop student research work planning, execution and reporting skills. To develop student skills for presenting the research work results in seminars.							
Study results: Student - is capable to analyse the literature and to compose the literature review in the selected project topic, - is able to apply and analyse the obtained theoretical knowledge in consequent working either in high-technological production in company or scientific research institution and is capable to work both independently and in a team, - is able to relate the skills acquired by practical work carried out in a company or in an academic research laboratory, to the knowledge acquired during his/her theoretical studies and be able to improve his/her knowledge as necessary, - writes the report about the research work and obtained results, - presents the research work results in the seminar.							
Compulsory courses: 18.00 ECTS credits							
EKX0411 - Project 1		6.00	4	0-4-0	Gr.Ass.	SP	2
EKX0413 - Project 3		6.00	4	0-4-0	Gr.Ass.	SP	4
EKX0412 - Project 2		6.00	4	0-4-0	Gr.Ass.	A	3

	*	ECT S credi ts	Weekly hrs	Le-Pr-Exe r	Evaluation	Teach. sem	Std sch sem
<i>Technologies of Wood and Furniture Products</i>							
<p>Goals: To give opportunities for the student to obtain knowledge:</p> <ul style="list-style-type: none"> - for working in the international wood industry producing saw materials, profiled and panel materials (plywood, MDF, wood chip panels, wood-plastics), engineering wood, wooden-, furniture and upholstery furniture products, - to be able to continue studying at the doctoral level in the scientific field of wood technology or wood polymer composites, - about the structure of wood and composite materials and the relations between their physical and chemical properties in order to develop the material selecting skills, creating thereby a theoretical basis for understanding wood processing and furniture production technologies and methods, - in the field of testing wood and wood polymer composite-, furniture and upholstery furniture products, - about the main and auxiliary production processes in the industry of forestry and saw materials, wood and wood panel materials, wooden and upholstery furniture and pre-fabrication of wooden houses, - new development trends in sustainable materials and products, where wooden and plastic waste from production and consumption are recycled for making new products or energy recovery. 							
<p>Study results: A student:</p> <ul style="list-style-type: none"> - will be able to solve problems related to his/her specialty and management in the modern high technology production, sustainable both in terms of materials and the environment, - proceeding from the structure and properties of different wood and wood-polymer composites, a student will be able to choose, depending on the purpose, the appropriate material, processing technology and method, - will know the principles and standard methods of testing wood materials (timber), wood products, furniture and upholstery, - will be familiar with reutilization and energy recovery technologies of wood and plastic production waste and consumption waste. 							
Compulsory courses: 18.00 ECTS credits							
EKW0420 - Woodworking Technology		6.00	4	2-2-0	E	A	1
EKW0570 - Technology of Furniture Industry		6.00	4	2-2-0	E	SP	2
EKW0580 - Technology of Upholstery Furniture Industry		6.00	4	1-3-0	E	A	3
Optional courses: at least 6.00 ECTS credits							
EKW0470 - Recycling and Energy Recovery of Wood, Textile and Plastic Wastes		6.00	4	2-0-2	E	A	3
KCM0350 - Biodeterioration of Materials		6.00	4	3-0-1	E	A	3
EKW0430 - Wood house production in factory		6.00	4	3-0-1	E	SP	4

	*	ECTS credits	Weekly hrs	Le-Pr-Exer	Evaluation	Teach. sem	Std sch sem
Special studies modules: technology of plastics and textiles							
<i>Technology of Plastics ; Technology of Textiles and Garment Industry</i>							
<p>Goals: To give opportunities for the student to obtain knowledge:</p> <ul style="list-style-type: none"> - and skills in order to be employed in the plastics and other polymeric materials processing as well as textiles and garment industries, - to continue his/her studies at the doctoral level in the field of material science, - about the relations between the structure and properties of polymeric materials and typical representatives of the materials in order to develop the skill of choosing materials, creating thereby a theoretical basis for understanding the essence of processing technologies and methods, - in the field of polymer composites and testing of polymers and textiles, - to get familiar with biopolymers, their genesis and ways of processing, - on the garment production technologies and equipment and using of 2D- and 3D-technologies, - on arranging quality systems in various textiles and garment production processes. 							
<p>Study results: A student</p> <ul style="list-style-type: none"> - will be able to solve problems related to his/her specialty and management in the modern high technology production, sustainable both in terms of materials and the environment, - proceeding from the structure and properties of different polymers, a student shall be able to choose, depending on the purpose, the material, processing technology and method, - will have acquired a theoretical basis and practical level sufficient for participating in product and technology development in plastics or textile materials processing industry, - will know the principles of testing polymeric and textile materials and the new possibilities offered by composite materials, - will be familiar with biopolymers, their genesis, processing methods and biodegradation, - is able to use acquired knowledge to choose suitable garment production technologies and equipment and to apply 2D- and 3D-technologies, - is able to use acquired knowledge on quality system management in organising various textiles and garment production processes. 							
Optional courses: at least 6.00 ECTS credits							
EKW0470 - Recycling and Energy Recovery of Wood, Textile and Plastic Wastes		6.00	4	2-0-2	E	A	3
EKW0580 - Technology of Upholstery Furniture Industry		6.00	4	1-3-0	E	A	3
EKT0050 - Smart and functional textile products		6.00	4	2-1-1	E	A	3
Submodule: Technology of Plastics 18.0 EAP							
EKP0611 - Technology of Plastics Industry 1		6.00	4	1-2-1	E	A	1
EKP0612 - Technology of Plastics Industry 2		6.00	4	1-1-2	E	SP	2
KMP0340 - Biopolymers: Basics, Production and Applications		6.00	4	1-1-2	E	A	3
Submodule: Technology of Textiles and Garment Industry 18.0 EAP							
EKT0010 - 2D and 3D Technologies in Garment Industry		6.00	4	1-3-0	E	SP	2
EKT0030 - Technology and Equipment of Textile and Garment Industry		6.00	4	2-2-0	E	A	1

	*	ECTS credits	Weekly hrs	Le-Pr-Exer	Evaluation	Teach. sem	Std sch sem
EKT0040 - Quality Management in Garment Industry		6.00	4	3-0-1	E	A	3
<i>Projects on Master Thesis topic</i>							
<p>Goals: For a student to acquire a profound knowledge and solid skills by project based learning connected with master thesis topic. For students to acquire practical skills of independent activity both in a scientific research laboratory and an enterprise processing wood, plastics or textiles producing wood products or furniture (depending on the Master thesis topic) under conditions of sustainable and environment-friendly production. To develop the capability of working in a team and solving problems independently, both in an enterprise and in an academic environment. To develop student research work planning, execution and reporting skills. To develop student skills for presenting the research work results in seminars.</p>							
<p>Study results: Student</p> <ul style="list-style-type: none"> - is capable to analyse the literature and to compose the literature review in the selected project topic, - is able to apply and analyse the obtained theoretical knowledge in consequent working either in high-technological production in company or scientific research institution and is capable to work both independently and in a team, - is able to relate the skills acquired by practical work carried out in a company or in an academic research laboratory, to the knowledge acquired during his/her theoretical studies and be able to improve his/her knowledge as necessary, - writes the report about the research work and obtained results, - presents the research work results in the seminar. 							
Compulsory courses: 18.00 ECTS credits							
EKX0411 - Project 1		6.00	4	0-4-0	Gr.Ass.	SP	2
EKX0413 - Project 3		6.00	4	0-4-0	Gr.Ass.	SP	4
EKX0412 - Project 2		6.00	4	0-4-0	Gr.Ass.	A	3