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DESCRIPTION OF MODULE

[Industrial design]

Aim	Students acquire knowledge in industrial design in order to know and be able to participate in the design and implementation of new products in production
Tasks **(Learning outcomes)**	**According to competence and responsibilities at the place of work:** Carry out the design and innovation management process in a constructive, organized and planned way; Carry out design work independently, in accordance with the applicable standards and using various tools; Start the digitization process in the plant, introduce new products in production, as well as improve production technology. **Able to:** carry out the design and innovation management process in a constructive, organized and planned way. **Knows:** The essence of innovation, the role, development and features of design and industrial design. **Understands:** The importance of the organization of the design and innovation process as well as the causal relations and factors influencing the development of design. **Able to:** carry out design work independently, in accordance with the applicable standards and using various tools; **Knows:** Furniture safety requirements, types of computer-aided design systems, the importance of visual communication in the production process. **Understands:** the importance and place of different standards and tools in the design process. **Able to:** start the digitization process in the plant, introduce new products in production, as well as improve production technology. **Knows:** the importance of the digitization process, the differences between the introduction of different types of products into production. **Understands:** causal relationships between the production of products of different designs, production technologies and equipment, as well as the importance of digitization in the company.
Assessment form	During the acquisition of the module, students get acquainted with the concept, development and importance of innovation and industrial design. During the acquisition of the module, the students perform case analyses on various design samples During the acquisition of the module, the students get acquainted with the problems and approaches of digitization and design.

CONTENT OF MODULE

Learning outcomes	Topics	Content (suggested)		Assessment of acquired learning outcomes (optimal level)	Methods and ideas for learning process	
Able to: carry out the design and innovation management process in a constructive, organized and planned way. **Knows:** The essence of innovation, the role, development and features of design and industrial design. **Understands:** The importance of the organization of the design and innovation process as well as the causal relations and factors influencing the development of design.	**1.1 The essence and management of innovation.**	**1.1.1 Definition and characteristics of innovation.**		**Describes the importance of innovation in the company, products, technologies and society.**	Students get acquainted with the definition, meaning and features of innovation.	
		1.1.2 Innovation management		**Describes innovation planning approaches and strategies at different levels of the company.**	*Discussion:* Students discuss the role of innovation in production and society, the most common mistakes and inaccuracies about innovation in society and production.	
	1.2 History and significance of industrial design.	**1.2.1 History of industrial design**		**Describes the factors influencing the formation of design, as well as the most characteristic cornerstones of design development.**	Students get acquainted with design theory, development history.	
		1.2.2 Role of design.		**Describes the importance of design in production and society development.**	Students get acquainted with the importance of design in history and nowadays.	
		1.2.3. Design development process.		**Describes the main cornerstones of design development.**	Students get acquainted with the design development process.	
		1.2.4 Design creation approaches.		**Describes design-creation approaches and their features.**	Students get acquainted with design creation approaches and their peculiarities. *Discussion:* Students discuss the nature of design and the factors influencing its development.	
		1.2.6 Design as an added value.		**Describes and understands the importance of design in the context of product value.**	Students get acquainted with the importance of design and requirements in the context of product price and cost formation.	

Able to: carry out design work independently, in accordance with the applicable standards and using various tools; **Knows:** Furniture safety requirements, types of computer-aided design systems, the importance of visual communication in the production process. **Understands:** the importance and place of different standards and tools in the design process.	**2.1 Furniture safety requirements**	**2.1.1 Introduction to furniture safety requirements and their regulatory documents.**		**Describes the nature and structure of documents forming furniture safety requirements.**	Students get acquainted with furniture safety standards.	
		2.1.2 Furniture classification.		**Describes the classification of furniture according to the relevant safety standards.**	Students get acquainted with the principles of furniture classification. *Case study:* students analyse different pieces of furniture and classify them according to the requirements of the standards.	
		2.1.2 Furniture safety requirements.		**Describes the main principles and justification of security requirements.**	Students get acquainted with furniture safety requirements, their nature and formation.	
		2.1.3 Furniture testing processes.		**Describes the main types and methods of furniture testing.**	Students get acquainted with the types of furniture testing. *Case study:* students discuss the nature of different testing methods and potential causal relationships that may affect test results.	
	2.2 Introduction to computer aided design.	**2.2.1 Introduction to CAD / CAM / CAE systems.**		**Describes the main differences between CAD / CAM / CAE systems and their role in design and manufacturing processes.**	Students get acquainted with the essence of CAD / CAM / CAE systems. *Case study:* students get acquainted with the most common digital design systems and their features.	
		2.2.2 Importance of computer-aided design and applicability in production.		**Describes the importance of computer-aided design in design and production conditions.**	Students are introduced to the role of computer-aided design in the context of product development and manufacturing, its advantages and disadvantages.	
		2.2.3 Working with computer-aided systems.		**Develop a simple 3D model of a product.**	*Practical work:* students identify an object in their vicinity and develop a 3D model of it.	
	2.3 Visual communication in the project and production development process.	**2.3.1 Presentation and structuring of information in production.**		**Understand the role of effective information presentation in design and production conditions.**	*Case study:* students get acquainted with the most common mistakes in the process of information design and methods for	

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					more efficient transfer of visually displayed information in digital or physical form.	
		2.3.2 The role of sketching in design and production.		**Describes the importance of sketching during design and production.**	Students get acquainted with the meaning and usability of sketches.	
		2.3.3 Principles of making sketches.		**Describes the main components of the sketch and their role in the process of creating a sketch.**	Students get acquainted with the basic components of a sketch and the process of creating a sketch. *Practical work:* students sketch objects close to them.	
Able to: start the digitization process in the plant, introduce new products in production, as well as improve production technology. **Knows:** the importance of the digitization process, the differences between the introduction of different types of products into production. **Understands:** causal relationships between the production of products of different designs, production technologies and equipment, as well as the importance of digitization in the company.	**3.1 Digitisation in production.**	**3.1.1 The importance of digitization.**		**Describes the importance of digitization in a modern manufacturing company.**	Students get acquainted with the concept and meaning of digitization in a manufacturing company.	
		3.1.2 Advantages and disadvantages of production digitalization.		**Compares and describes the advantages and disadvantages of the digitization process.**	*Discussion:* students discuss the changes that are taking place in the company during the digitization process.	
		3.1.3 Structure and operating principles of a digitized production plant.		**Describes the basic elements of the digitization system and the principles of their operation.**	Students get acquainted with the digitization process and the basic elements of the system.	
		3.1.4 Introduction and maintenance of digitization in production.		**Describes the implementation and maintenance process of the digitization system.**	Students get acquainted with the process of implementation and maintenance of the digitization system. *Case study:* students analyse real digitization systems.	
	3.2 Design and start of production	**3.2.1 Design and implementation of standardized products in production.**		**Describes the process of designing and implementing standardized products in production.**	Students get acquainted with the standardized product design process and production implementation process. *Case study:* students analyse real-life experience stories.	
		3.2.2 Design and implementation of non-		**Describes the process of design and production of non-standard**	Students get acquainted with the standardized product design process and	

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		standardized products in production.		**products.**	production implementation process. *Case study:* students analyse real-life experience stories.	
		3.2.3 Design and production of unique and specifically complicated products.		**Describes the process of designing and manufacturing products that are particularly complex or complicated.**	Students get acquainted with the standardized product design process and production implementation process. *Case study:* students analyse real-life experience stories.	
		3.2.4 Principles of plant and equipment design.		**Describes plant and equipment design considerations and causality.**	Students get acquainted with the design process of production facilities and equipment. *Case study:* students analyse equipment or technological solutions in a factory.	
		3.2.5. Product and production technology interaction and causation.		**Describes the interaction between the product and production technology.**	*Discussion:* students discuss the causal relationship between the final product and production technology.	

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