

Annex. Learning outcomes and criteria for verification within individual units – mechatronics technician

Learning outcomes and criteria for verification within the 'Health and Safety at Work' unit	
Learning outcomes	Verification criteria
Student:	Student:
Complies with rules on health and safety at work, fire protection, environmental protection and ergonomics.	<ul style="list-style-type: none"> – uses terminology on health and safety at work, fire protection and environmental protection – organises work with the required level of protection of health and life against risks in the working environment – describes fire protection rules – identifies fire safety information signs – pays attention to others implementing principles of health and safety at work, fire safety, environmental protection and ergonomics; – uses personal protective equipment in the exercise of professional tasks – applies the rules for the organisation of workstations related to the use of equipment – uses instructions for the use of technical equipment in the performance of professional tasks
Learning outcomes and criteria for verification within the unit "Installation of components, sub-assembly and mechanical assemblies"	
Learning outcomes	Verification criteria
Student:	Student:
Characterises components, subassemblies and mechanical assemblies	<ul style="list-style-type: none"> – recognises components, subassemblies and mechanical assemblies, e.g. shafts, axles, bearings and clutches, transmissions, mechanisms and springing elements – determines the use of components, subassemblies and mechanical assemblies – selects components, subassemblies and mechanical assemblies for assembling mechatronic equipment and systems – selects parts of machinery and equipment
Performs measurements of the geometrical size of machinery elements	<ul style="list-style-type: none"> – selects control and measurement instruments for measuring the geometrical dimensions of machinery elements – applies the principles for measuring the geometrical dimensions of machinery elements – selects methods for measuring the size of the geometrical elements of machines
Plans and carries out manual and mechanical work	<ul style="list-style-type: none"> – selects tools for manual work , e.g. marking-out tools, cutting tools, bending, straightening, files, blades, threaders, rivets and drills – selects machine tools, e.g. knives, drills and friezes – performs manual work, e.g., routing, cutting, sawing, straightening, bending, drilling, reaming and threading – performs machine work, e.g. turning, milling, drilling and grinding

Selects methods of combining metals and their alloys	<ul style="list-style-type: none"> – prepares materials necessary for making separable and inseparable connections – makes separable and inseparable connections
Assembles and disassembles components and mechanical assemblies	<ul style="list-style-type: none"> – selects instruments for assembly and disassembly of mechatronic components and assemblies, e.g. measures, callipers, micrometers, microscopes, mirrors, auxiliary instruments, fixtures and devices for carrying out repair work – organises a workstation for assembling and dismantling components and mechanical assemblies – assembles compression, threading and shape joints – assembling slip, roller and susceptible components – disassembles of compression, thread and shape joints – disassembles slip, roller and susceptible components
Learning outcomes and criteria for verification within the unit	
“Installation of pneumatic and hydraulic components, sub-assemblies and assemblies”	
Learning outcomes	Verification criteria
Student:	Student:
Characterises the construction of pneumatic and hydraulic components, sub-assemblies and assemblies	<ul style="list-style-type: none"> – distinguishes pneumatic components, sub-assemblies and assemblies, e.g. compressors, filters, valves, motors, engines, pneumatic preparation unit, dryer, lubricator, pumps, cooler and heater – distinguishes between hydraulic components, sub-assemblies and assemblies, e.g. batteries, pumps, motors, motors, valves, filters – selects components, sub-assemblies and pneumatic assemblies for assembly – selects components, sub-assemblies and hydraulic assemblies for assembly
Selects size measuring instruments for pneumatic and hydraulic systems	<ul style="list-style-type: none"> – distinguishes between size measuring instruments in pneumatic systems, e.g. pressure indicators, manometers, thermometers, liquid level indicators, flow indicators, flow meters, pressure transducers, analogue and digital sensors on the basis of symbols, markings and appearance – distinguishes between size measuring instruments in hydraulic systems, e.g. pressure indicators, manometers, thermometers, liquid level indicators, flow rate, flow meters, revolution counters, analogue and digital sensors based on symbols, markings and appearance – performs volume measurements in pneumatic and hydraulic systems
Assembly and disassembly pneumatic and hydraulic components, sub-assemblies and assemblies	<ul style="list-style-type: none"> – selects tools for assembling and dismantling pneumatic and hydraulic components, sub-assemblies and assemblies – plans assembly and disassembly operations of pneumatic and hydraulic components, sub-assemblies and assemblies – assesses the correct assembly of pneumatic and hydraulic components, sub-assemblies and assemblies

	<ul style="list-style-type: none"> – uses the technical documentation when assembling pneumatic and hydraulic components, sub-assemblies and assemblies
Learning outcomes and criteria for verification within the unit “Installation of electrical and electronic components and sub-assemblies”	
Learning outcomes	Verification criteria
Student:	Student:
Selects electrical and electronic sub-components and components for installation in mechatronic devices and systems	<ul style="list-style-type: none"> – selects electrical and electronic components and sub-assemblies for installation in mechatronic devices and systems according to the diagram – selects electrical and electronic components and sub-assemblies for installation in mechatronic devices and systems as intended
Assembles and disassembles electrical and electronic components and sub-assemblies	<ul style="list-style-type: none"> – selects tools for assembling and dismantling electrical and electronic components and subassemblies, e.g. side pliers, insulation pliers, flat and circular tongs, wire and cable cutting shears, wrenches, screwdrivers – selects measuring instruments used when assembling electrical and electronic components and sub components, e.g. amperometers, voltmeters, watt-meters, analogue universal meters, digital multimeters – uses measuring instruments when assembling electrical and electronic components and sub-assemblies – specifies the technical condition of electrical and electronic components and sub-assemblies prepared for assembly – assembles electrical and electronic components and sub-assemblies – dismantles electrical and electronic components and sub-assemblies – performs mechanical assembly of electrical components and sub-assemblies
Learning outcomes and criteria for verification within the unit “Operation of mechatronic equipment and systems”	
Learning outcomes	Verification criteria
Student:	Student:
Activates mechatronic equipment and systems in accordance with instructions	<ul style="list-style-type: none"> – examines technical and operational documentation on the activation of mechatronic equipment and systems – activates functional blocks of mechatronic equipment and systems in the specified sequence – activates mechatronic equipment and systems in accordance with documentation – checks the correct functioning of mechatronic equipment and systems – applies safety rules when starting mechatronic devices and systems
Learning outcomes and criteria for verification within the unit “Maintenance of mechatronic equipment and systems”	
Learning outcomes	Verification criteria
Student:	Student:

Performs maintenance work on components, sub-assemblies and assemblies of equipment and mechatronic systems	<ul style="list-style-type: none"> – visually examines components, sub-assemblies and assemblies of equipment and mechatronic systems – chooses how to maintain mechatronic equipment and systems – carries out maintenance work on components, sub-assemblies and assemblies of equipment and mechatronic systems – assesses the quality of the maintenance work carried out on components, sub-assemblies and assemblies of equipment and mechatronic systems – draws up a record of the maintenance work carried out
Learning outcomes and criteria for verification within the unit “Operating mechatronic equipment and systems”	
Learning outcomes	Verification criteria
Student:	Student:
Applies the operating rules to mechatronic equipment and systems	<ul style="list-style-type: none"> – operates mechatronic equipment and systems – complies with the rules governing operating mechatronic equipment and systems – operates mechatronic equipment and systems
Sets process parameters in mechatronic equipment and systems	<ul style="list-style-type: none"> – changes the setting of the components of the adjustment systems – sets process parameters in mechatronic devices – fixes the characteristics of mechatronic devices over the communication network
Learning outcomes and criteria for verification within the unit “Development of technical documentation of mechatronic equipment and systems”	
Learning outcomes	Verification criteria
Student:	Student:
Prepares technical documentation for mechatronic equipment and systems using computer programs to assist in the design and manufacture of CADs	<ul style="list-style-type: none"> – distinguishes computer programs supporting CAD design and production – uses computer programs to support CAD design and production – establish technical documentation for mechatronic equipment and systems using computer programs supporting the design and production of CADs
Compiles documentation for the assembly, dismantling and operating mechatronic equipment and systems	<ul style="list-style-type: none"> – creates documentation for assembly and dismantling of mechatronic equipment and systems – draws up instructions for the use of mechatronic equipment and systems – draws up instructions for the maintenance of mechatronic equipment and systems

Learning outcomes and criteria for verification within the unit ‘Basics for programming of mechatronic equipment and systems’
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Learning outcomes	Verification criteria
Student:	Student:
Uses software to programme mechatronics machinery	<ul style="list-style-type: none"> – describes software for programming of mechatronics – uses software to programme PLC controllers
Tests the performance of programmes for mechatronics	<ul style="list-style-type: none"> – launches programs to programme PLC controllers – tests the operation of programmes for PLC controllers
Checks process parameters in equipment programmes and mechatronic systems	<ul style="list-style-type: none"> – checks process parameters in equipment and mechatronic systems controlled by PLC controllers – changes process parameters in PLC controlled mechatronic programs and systems
Learning outcomes and criteria for verification within the unit “Communication in English”	
Learning outcomes	Verification criteria
Student:	Student:
uses basic vocabulary in English enabling the professional activities to be carried out	<ul style="list-style-type: none"> – understands simple oral, explicit and standard English language – examines and interprets short written texts relating to the performance of typical professional activities – identify and apply language measures to carry out professional activities – formulates short and understandable words and written texts on its own; – uses some formal English – simplifies (if necessary) statements, replaces unknown words with others, uses non-verbal means – completes the Log of Practice in English
Learning outcomes and criteria for verification within the ‘Personal and social competence’ unit	
Learning outcomes	Verification criteria
Pupils:	Pupils:
respects the principles of good behaviour and work ethics	<ul style="list-style-type: none"> – applies the principles of proper behaviour – applies generally accepted standards of behaviour in the working environment, taking into account the culture of the host country – complies with the principles of dress code in the workplace
Improves professional skills	<ul style="list-style-type: none"> – shows willingness to acquire new skills on its own initiative – improves performance of professional tasks (e.g. in terms of quality/speed of work)