**ERASMUS+ - SECTOR SKILSS ALLIANCE**

**[DURATION: November 2014 – October 2017]**

Unit of Learning Outcomes

***Reading Technical Documentation - Electro***

**[WORKPACKAGE 3: Designing joint curriculum]**

**[OUT 3.1 and 3.2: unit of learning outcomes]**

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1. **Description of short training programme**

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| Learning outcomes | The learners/trainees will be able to:1. identify and interpret a type of normative documentation;
2. describe electric, electronic and magnetic appliances, installation and equipment, their operation from the handout;
3. describe and perform measurements and diagnostics.
 |
| Relation to the national qualification/educationNQF/EQF | **SI:** NQF 4/EQF 5**LV:** NQF 4/EQF 4**SK:** NQF 3/EQF 4**HR:** EQF 4.1, 4.2/EQF 4 |
| Links to existing educational programs | **SI:** * Electrical engineering technician
* Mechatronics engineering technician

**LV:*** CNC operator
* Industrial mechanic
* Engineering technician
* Mechatronics system technician

**SK:** * Electrical engineering
* Electromechanician
* Mechanical engineering
* Mechanician – extender
* Toolmaker
* Mechanical production

**HR:*** Mechanical computer technician 4 years
* Mechatronics technician 4 years
* Computer technician in mechanical engineering 4 years
* CNC operator 3 years
 |
| ECVET points | **SI:** 1 ECVET point**LV:** 1 ECVET point**SK:** 1 ECVET point**HR:** 1 ECVET point |
| Assessment criteria |

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| --- | --- | --- |
| **Field of evaluation** | **Evaluation criteria** | **Points** |
| **1 Planning** | The learner schedules activities based on understanding the assigned problem task. (S)He independently identifies and prepares available sources, tools and measures required for resolving the task. | 10 |
| **2 Execution** | The learner accomplishes assigned task. (S)He acts in independent manner, applies the economic, quality and safety principles. The learner independently evaluates the outcome(s) and adapts to the situation. | 60 |
| **3 Documentation** | The learner prepares all required documentation for further working based on TDM principles. | 10  |
| **4 Presentation** | The learner performs and presents particular stages of the assigned task systematically, comprehensibly and adequately. (S)He uses and understands the appropriate technical terminology.  | 20 |
| **TOTAL** | **100**  |
|  **Pass criteria: 60 points** |  |

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| Work tasks (annex) | Examples. Include the documentation with information about exam (annex). |
| Forms and methods of work | Learning methods:* Group work
* Individual work
* Practical demonstration

Working methods:* Frontal instruction
* Demonstration
* Practical work, exercises.
* Case study method.
* Conversation and debate.
* Homework.
* Observation and detection.
* Evaluation.
 |
| Material conditions for the training | The training provider must ensure:* bright and airy space with working tables,
* a class with multimedia equipment,
* learning materials,
* LCD projector,
* blueprints, schemes, manuals, product catalogues,
* converting tables,
* layout tools, drawing tools,
* measuring instruments.
 |
| Personal references | Training and examinations can be carried out by a person with required professional competences/education and experience according to national regulations. |
| Framework curriculum (vocational school) | Legal bases for the education in vocational schools according to respective occupation. |
| Framework curriculum (in company) | Legal bases for the training in companies according to respective occupation. |

**Annex: work tasks**

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| --- | --- |
| **Learning outcomes** | **Work tasks** |
| 1. Identification and interpret a type of normative documentation
 | * Explains:

a) types of normative documents and standardsb) content and structure of normative documentationc) taxonomical terms (functional element, unit, block etc.)* Work with norms/standards, tables and catalogues
* Explains the use of CAD software in electrotechnology
 |
| 1. Description of electric, electronic and magnetic appliances, installation and equipment, their operation from the handout
 | * Explains symbols, complementary symbols, symbols for circuit and passive elements, switchers, breakers, controllers etc.
* Explains and describes:

a) electric contacts, circuits, printed circuits/printed circuit boards, networksb) standalone and integrated appliances – related schemes* Propose simple scheme
 |
| 1. Description and performing measurements and diagnostics
 | * Physics in electrotechnology: IS of units, IS of quantities, laws, constants
* Mathematics in electrotechnology: operations, functions
* Explains the principles and methods of measurement and data evaluation using ICT
* Performs measurement/diagnostics and propose and apply adequate corrective measures
* Earthing, insulation, risk management and protection
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1. **Assesment:**

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| --- | --- | --- | --- | --- | --- | --- |
| **Learning outcomes** | **Skills and areas of knowledge should be be tested** | **Methods**  | **1****Plan.** | **2****Exe.** | **3****Doc.** | **4****Pre.** |
| 1. Identification and interpret a type of normative documentation
 | * Distinguishing the types of normative documentation (4 groups of electrotechnical schemes)
* Characteristics of electrotechnical nomenclatures and IEV
* Electrical, electronic and magnetic device and equipment in context (standalone, integrated)
* Using correct terminology in line with IEV
* Characterise the use of CAD in electrotechnology
* Independent acting
* Analytical thinking
* Efficiency of the problem solving
* Keeps the workplace organised
* Correct manipulation with drawing
 | written test oral – practical example | - | 15 | - | 5 |
| 1. Description of electric, electronic and magnetic appliances, installation and equipment, their operation from the handout
 | * Selection of tools (conversion tables, measures, int./nat. norms/standards)
* Interpretation of symbols from the drawing
* Interpretation of different types of circuits
* Characterise the feature of appliance/device
* Propose the simple scheme with the use of ICT
* Using the correct terminology
* Identification of one’s mistakes, self-correction
* Effective time-frame schedule
 | written test oral – practical example | 5 | 25 | - | 10 |
| 1. Description and performing measurements and diagnostics
 | * Selection of tools (conversion tables, measures, int./nat. norms/standards)
* Explaining the selected aspects of physics in electrotechnology
* Explaining the selected aspects of mathematics in electrotechnology
* Define and describe the common measurement and diagnostics appliances
* Describe the data evaluation principles
* Perform measurement
* Perform diagnosis
* Describe the common protection measures, health and safety protection rules
* Calculations
* Using the correct terminology
* Identification of one’s mistakes, self-correction
* Effective time-frame schedule
* Independent acting
* Analytical thinking
* Efficiency of the problem solving
 | written test oral – practical example  | 5 | 20 | 10 | 5 |
| **SUM** |  |  | **10** | **60** | **10** | **20** |

1. **Process/execution method:**

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| 1. Information and Planning
 | The individual understands the task in the context of the working process. (S)He chooses the correct tools and prepares his/her working environment based on the analysis of submitted documentation and related assigned problem.  |
| 1. Execution of Work
 | The individual executes the task independently: identifies the type of submitted documentation and solves the related problem efficiently.  |
| 1. Control and Evaluation
 | The individual applies the self-evaluation continuously during the execution of the assigned task. Where necessary applies corrective measures. (S)He is able to ask for assistance if necessary.  |
| 1. Cleaning and Waste Disposal
 | The individual maintains his/her workplace and working tools safe and clean continuously. (S)He applies the measures of environmental protection continuously.  |
| 1. Work Safety and Health Protection
 | The individual observes safety regulations and health protection regulations independently. (S)He is responsible for his/her own safety and the safety of the small team.  |
| 1. Work Attitude
 | The individual works independently, efficiently and economically. (S)He takes responsibility for his/her own work and the work of the small team.  |