**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/education  NQF/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 | |  |  |  | | --- | --- | --- | | **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** | |  | |
| 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 standards  b) content and structure of normative documentation  c) 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, networks  b) 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 |

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. |