



## **Training concept for VET teachers, trainers and instructors**

**Within Erasmus +, KA3  
National Centres for Apprenticeship  
Introduction of Elements of DUAL VET in Slovak Republic**



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# 1. Designing of Educational Programs for Selected Fields of Education

## 1.1 Selected fields of education

By identifying the most desirable occupations were selected for those project seven fields of education:

- 2411 K mechanic adjuster
- 2412 K mechanic of numerically controlled machines
- 2423 H toolmaker
- 2433 H metal worker
- 2426 K programmer cutting and welding machinery and equipment
- 2679 K mechanic - mechatronic
- 2697 K mechanic - electrician

According to statistics of repletion and study options in secondary schools for the school year 2016/2017 published on <http://www.svs.edu.sk/prehlady.aspx> plans in these fields 170 schools to receive first year 3,257 pupils. Their structure is in following table:

| Field of education |  | School year 2016/2017 |                            |
|--------------------|--|-----------------------|----------------------------|
| Code               | Name   | Number of schools     | Estimated number of pupils |
| 2411 K             | mechanic adjuster                                      | 28                    | 687                        |
| 2412 K             | mechanic of numerically controlled machines            | 4                     | 50                         |
| 2433 H             | toolmaker  | 8                     | 85                         |
| 2423 H             | metal worker   | 26                    | 342                        |
| 2426 K             | programmer cutting and welding machinery and equipment | 23                    | 420                        |
| 2679 K             | mechanic - mechatronic                                 | 18                    | 365                        |
| 2697 K             | mechanic - electrician                                 | 63                    | 1308                       |
| <b>Together</b>    |  | 170                   | 3257                       |

Selected fields of education can be according to achieved level of education divided into two groups of fields of education:

- a group 24 Mechanical Engineering and Other Metalworking Production II
- a group 26 Electrician.

By level of received education as training divided into:

- Group of apprenticeship fields of education, into which belong apprenticeship fields of education and orientations of apprenticeship fields of education

at secondary vocational schools, the completion of which pupil acquires secondary vocational education (marked with the letter H)

- Group of study fields of education with big part of training, into which belong study fields of education and orientations of study fields of education at secondary vocational schools, the completion of which pupil acquires complete secondary vocational education (marked with the letter K).

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This differentiation will also be taken into account when designing educational programs for teaching staff of vocational education and educational programs for trainers of vocational education. The bases for substantive focus of professional training programs are:

State Educational Programme (SEP), which defines the individual levels of education and fields of education beyond compulsory education guaranteed by the state.

School educational program (SchEP) as the basic pedagogical school document defines the objectives, content and learning conditions, it recommends appropriate teaching practices and proposes methods of verification and evaluation of results of implementation of the training program. It based on the SEP and complements the current needs and requirements of schools and employers of the region.

The content and scope of vocational education and training in the dual training being a model curriculum and sample curricula that are part of the national curricula for vocational education and training:

- Sample timetable (VUP) defines the number of weekly teaching hours for general education and vocational training, the theoretical education (organized by secondary vocational school) and practical training (organized by the employer). The memorandum provides for the organization of teaching and its components (not edit hours of subjects and their content, divide the class into groups and so forth.). Overview weeks of use provide the number of weeks spent teaching and other activities for the entire study.
- Sample curriculum (VUO) is prepared for each specialist subject teaching. It contains characteristics of an object, educational objectives and content broken down into thematic units for each year in which the subject is taught. Thematic units have defined the time allocated.

## **2. Designing of educational programs for VET pedagogical staff in selected fields of education**

Educational programs for pedagogical staff will be focused primarily on obtaining information about innovations in production processes, new educational media and new methods of vocational education and training. Their main aim is to improve and update the expertise of educational staff in vocational education and training.

**When designing educational programs should be determined:**

- target group
- goal

- the program
- the location of the realization
- professional guarantee
- lecturers

**In determining the target group is taking into account:**

- group of fields of education
- field of education
- teaching modules or subjects
- category of teaching staff

**In determining the goal is taking into account:**

- *type of continuing education* - updating or innovative

The aim of the updating education of educational staff is maintaining professional competences necessary for standard performance teaching. The aim of the innovative education of educational staff is to develop professional competencies required for the standard of teaching carried out.

**When determining the program** it should be based on the target group and the objective of the training activities. Content needs to be modified in relation to the starting point for substantive focus of professional training programs within the selected learning module respectively subject. An important role will be given information on the need to update or upgrade the contents of education, which will benefit directly from the Employers.

**Place of realization** is determined depending on the material, technical and personnel terms satisfactory to implement the educational program. The actual performance of the educational activity can also be performed in several places (eg. Centres of vocational education and training (CVETs) + companies ...).

**Expert guarantor** of the training program is the natural person who on the basis of and within the acquired competencies and teaching competence is responsible for project quality educational program for the quality of its implementation and coordination of the lecturers.

**The lecturer** of educational program is the natural person who on the basis of and within the acquired competencies and capabilities lecturing conducted educational activities to the extent specified educational programs.

When designing training programs for educational staff the starting points will be model curricula and model curricula discussed by the Council for Vocational Education and Training and approved by Ministry of Education, Science, Research and sport of Slovak Republic in addition to the SEP. The key subject will be practical training and through its educational goals the curriculum of professional teaching subjects, too. Specifically, the content focus will result from the proposals of employers and the needs of the teaching staff. Range of learning activities

appropriate to propose within 1-3 days depends on the complexity of topics of the educational program. Part of each training activity will be practical demonstrations through a learning hours or model - sample learning day.

## **2.1 Designing of educational programs for VET pedagogical staff in field of education 24 - Mechanical Engineering and Other Metalworking Production I**

The model curricula for field of education 24 - Mechanical Engineering and Other Metalworking Production had been approved by Ministry of Education, Science, Research and sport of Slovak Republic in 2015.

When designing educational programs for VET pedagogical staff of selected fields of education in taking into account cross-curricular activities the programs will be based on the following educational objectives:

### **2411 K mechanic adjuster**

#### **Educational objectives of the subject practical training:**

Graduate knows properly and independently read technical drawings and take, schemes of components. Master the basics of technological processes in machine metalworking, technical terminology and symbolism, and can choose the optimum cutting conditions. Controls the basic operations work on conventional machines (lathe, milling machines, grinders, drills) and can use them. Controls the basic concepts used in numerically controlled machine tools using specific software (CAM systems), which are used in the professional field of respecting legal and ethical use of information technology and products. He/she can create CNC program using technical documentation. To know the basic hand-held metal working, and can measure the basic measure used in the engineering industry. Can active, creative and effective use of computer technology in solving tasks related to the production process. Production facilities can properly service and kept in good condition. He/she observes the principles of occupational safety, fire protection and environmental protection. If necessary, he/she can provide first aid.

The curriculum is divided into different grades as follows:

1st grade curriculum focuses on mastering the most important operation with manual processing of metals. It goes on basic education for metal cutting machines. The content is practical work - working on the machine. This will create conditions for better cope with challenging curriculum in higher grades.

2nd year curriculum is divided into four types of machine machining: turning, milling, grinding, drilling, and CNC machine - compiling a simple program for CNC lathe and milling machines.

The curriculum follows the 3rd year mechanical machining of the second year. The key of the curriculum is setting up and operating CNC machine production

program and subprogram. Professional training in all classes must closely follow the curriculum of technology and programming of CNC machines. It is necessary to develop thematic coordination plans under the terms of workshops and practical training workplace.

4th grade curriculum is aimed at deepening and broadening the knowledge, skills and habits in the workplace companies by production program. The emphasis is on setting up and operating conventional and CNC machines and tools. Creation of control programs, their correction and creation of technological procedures.

## **2426 K programmer cutting and welding machinery and equipment**

### ***Educational objectives of the subject practical training:***

The aim of practical training is to provide students body of knowledge, skills and competencies for metal cutting, workplace organization and work in manual and mechanical machining. The one of the main objectives is make the association of theoretical knowledge with practical activities. The emphasis is on acquiring basic skills in work that directly result from the chosen field. Students are guided towards independence, the development of creative thinking and technical ability to implement theoretical knowledge in practical activities. The key task is to teach students the correct working practices and habits for manual metalworking and for machining operations, namely: turning, milling, grinding and drilling. In the higher grades there is prevalence of bonding by metal brazing and welding in particular. In addition to practical skills, the subject must provide students enough knowledge and habits in the area of safety as well as sufficient knowledge of STN. In the higher grades, the students learn to use and create programs for NC machine tools and acquire core competencies to control robotic workplace for welding. In addition, within the scope of pupils take welding courses from-M1.

The curriculum is divided into different grades as follows:

In 1st grade pupils acquire knowledge, skills and habits in the field of manual processing of metals. Become familiar with the organization of work for machine cutting and the fundamental work on individual ways of working.

In the 2nd year of developing the knowledge and skills of students in turning, milling, drilling or grinding and acquire the skills needed for gas welding.

In the 3rd year, the students are familiar with complex and special works on various types of machine tools. The key of the curriculum is setting up and using program controlled machine tools and skills from welding in a controlled atmosphere, which is a condition for passing the course.

In the fourth year the emphasis is on developing expertise and skills in operating conventional and numerically controlled machine tools and tools. The next is obtaining skills of arc welding electrodes, respectively, passing rate, if it is included in the curriculum of practical training. Filling training this year is also the operator of robotic workplace for welding. Vocational training must closely follow the curriculum of technology and programming.

## **2423 H toolmaker**

### ***Educational objectives of the subject practical training:***

The aim of training is to reach students with professional and personal growth. Professional and educational level of students to enable them to cope with technologically challenging and innovative work tasks, their good education encourage career helping to build personality has a direct impact on the personal lives of students. The most important educational activity affects behaviour and Students, their motivation, interest and own initiative. It is important to building a relationship to work, perseverance, quality of work performed and order in the workplace. Important is the willingness of students to acquire new theoretical knowledge, ability to work in teams, and build good interpersonal relationships. Teaching training under real production conditions gives students the opportunity to gain experience, skills and competencies at all levels of their training and help them in their integration into the labour market. Students recognize corporate environment, the actual production sites, meet corporate culture, and acquire experience with a real working team. Familiar with modern technical equipment companies have the opportunity to work on new technological devices.

The curriculum is divided into different grades as follows:

In 1st grade pupils acquire basic skills and habits of hand and machine metal processing, familiar with the tools and equipment, as well as the organization of work and the principles of safe and hygienic work and gradually gaining work experience.

In the 2nd and 3rd year pupils acquire special skills in the production of tools, jigs, dies, models, dies, special gauges and draw up a set of working. Target Knowledge is knowledge related to the use of tools for manual processing of metals, operation and management of machine tools both conventional as well as numerically controlled (CNC) machine tools.

## **2433 H metal worker**

### ***Educational objectives of the subject practical training:***

The aim of teaching the subject specialist training in apprenticeship 2433 H metal worker is to give students a set of knowledge, skills and competencies of habits, phenomena, patterns and relationships between them to form logical thinking and develop knowledge, skills and key competences useful also in further education, vocational training and civic life. Students acquire knowledge of selected concepts, acquire specialized terminology, observe technological discipline will control the basic rules of safety on machines and equipment. Students became convinced of the usefulness of theoretical knowledge and practical skills that vocational training is important for their personal growth, not only in terms of specific practical content, but also of the general principles of detecting life on earth. I can make active use of computer technology to solve a very simple tasks related to the production process. Production facilities can properly service and kept in good condition.

The curriculum is divided into different grades as follows:

1st grade curriculum focuses on mastering the most important operation with manual processing of metals. It goes on basic education for metal cutting machines. The content is practical work - working on the machine. This will create conditions for better cope with challenging curriculum in higher grades.

2nd year curriculum is divided into four types of machine machining: turning, milling, grinding, drilling, and CNC machine - compiling a simple program for CNC lathe and milling machines.

The curriculum follows the 3rd year mechanical machining of the second year. Further follow-up skills will be given by expanding production program. Professional training in all classes must closely follow the curriculum technology. It is necessary to develop thematic coordination plans under the terms of workshops and practical training workplace.

## **2.2 Designing of educational programs for VET pedagogical staff in field of education 26 - Electrician**

The model curricula for field of education 26 - Mechanical Engineering and Other Metalworking Production had been approved by Ministry of Education, Science, Research and sport of Slovak Republic in 2015.

When designing educational programs for VET pedagogical staff of selected fields of education in taking into account cross-curricular activities the programs will be based on the following educational objectives:

### **2679 K mechanic mechatronic**

#### ***Educational objectives of the subject practical training:***

Decisive importance for the training of students is subject teachers training. Its mandate must consistently deliver on time and content filling, using such technical equipment that requires the teaching of the department. The curriculum is training arranged to follow the theoretical component preparation. Allow students gain basic orientation in the area of production of parts, assembly machinery, electrical equipment, simpler electronic circuits and control circuits. Students during the preparation learn the basic techniques and work so as to be able to set up, operate, diagnose, repair complex automatic - mechatronic devices. In these works they will learn skills to acquire skills in the specializations of mechanics, electrical, pneumatic and hydraulic actuators, the control electronics, control circuits, control systems required by the profession mechatronics. The content of the subject follows its extremely thorough personnel and technical equipment. Difficulty department is taught at technical representative from whom the findings generalize to a wider range of automated devices. The intensity of the department before each thematic total student must be familiar with the safety regulations.

The curriculum is organized from 1st to 4th grade so that the student can develop experience and skills in technically demanding diagnostic control systems and



troubleshooting with automated systems that require mechatronics with upper secondary vocational education.

## **2697 K mechanic electrician**

### ***Educational objectives of the subject practical training:***

The aim of the subject is the connection of theoretical knowledge with practical activities. The emphasis is on acquiring skills in work that directly result from the chosen field. Students are guided towards independence, the development of creative thinking and technical ability to implement theoretical knowledge in practical activities. The target skill of course practical training lies in getting habits for manual labour in the various issues relating to learning the simple assembly work, the processing activities, the making of parts and units of equipment in the grading of skills associated with the systematic diagnostic activity related to operation and maintenance.

The curriculum is divided into different grades as follows:

Pupils in Years 1 and 2 acquire the basic skills of manual machining of metals and other materials familiar with measuring instruments, tools, plant and machinery, workshop and workplace training. Acquire basic drawing diagrams, measuring electrical and non-electrical quantities and perform different assembly work.

Students in grades 3 and 4, depending on the preparation of field:

- In the area of automation technology, this is familiar with the production, maintenance and deployment of electric automation equipment in practice
- In the area of telecommunications equipment to become familiar with parts of the telecommunications and security devices so that they can apply the acquired knowledge in practical applications in installations, repairs or installation of individual telecommunications and security equipment
- in car electronics, where familiar with assembly, disassembly and repair of electronic equipment vehicles.
- In the area of consumer technology that is familiar with electronics, integrated circuits, consumer technology, equipment repair, manufacturing, installation and repair, construction of complex electronic equipment their measurements and adjustment, searching, and troubleshooting electronic equipment.
- In the field of diagnostics refrigeration and air conditioning, there are familiar with the installation, diagnostics, maintenance and repair of refrigeration, air conditioning and heat pumps.

### **3. Designing the educational programs for in company trainers**

In line with the § 22 of the Act no. 61/2015 Coll. on vocational education and training, the content of educational programs for instructors specialized in:

- safeguard the rights and obligations of the student in the practical teaching.
- organization of practical training,
- measures to ensure the safety and health of practical training,
- educational standards for practical training for a particular course of study or the relevant field of study.

- sample curriculum for a particular study area or a model curriculum for the relevant field of study and sample curriculum for vocational training, professional experience and artistic practice of the study program or a model curriculum for vocational training, professional experience and artistic practice of the apprenticeship, if will operate instructor at the workplace of practical training,
- manner in which the instructor to pupil assessment and classification.

To prepare instructors for practical training with an employer in the workplace of practical training if the student is preparing in system of dual education differs training in accordance with the classification instructor for the position:

- a) "master" instructor.
- b) "Authorized" instructor.

**"Master" "instructor"** a natural person in the position of instructor under the Law on Vocational Education and Training, which led student carries out practical training on the job practical training. "Master" instructor ensures the vocational education and training in the workplace of practical training.

**"Authorized" instructor** a natural person in the position of instructor under the Law on Vocational Education and Training, which led student carries out practical training on the job practical training.

Training of instructors for the dual system of education in regard to those divided into:

- a) preparing a "master" instructors for dual education.
- b) preparing a "authorised" for the instructors for dual education

For instructors conducted lecturer of the instructors for dual. Selection of lecturers of the instructors for dual provides estates or professional body which has received a nomination instructor of the instructors for dual. Recruitment of Teachers of the instructors for dual is approved by the Council of Employers for dual to the proposal presented by professional or professional organization. Proposal by professional and professional organizations may include a teacher's activities for a particular module of the instructors. The lecturer is a natural person performing for instructors for dual which:

- was nominated by professional or trade association, employers' association, chamber, or guild was nominated employers pursuing practical training in the dual education, which has more than 20 instructors,
- has lecturing experience accompanied by the references or experience in educational activities, control activities and other related activities.
- has expertise with the contents of the instructors,
- the ability to learn and ability to work with (experience working with pupils and parents is an advantage).

For instructors for SDV can Lecturers more trainers who will own lecturers relevant modules of the instructors. If the instructor of the instructors has experience in performing activities instructor may call for the preparation of "major" instructors experienced instructor and thus expand the training of practical experience.

### **3.1 Designing the educational programs for “master” in company trainers for system of dual education**

The preparation of “master” in company trainers for system of dual education can be provided by:

- organization (association, chamber, guild, etc.) By a lecturer of the instructors for dual under the authority of by professional or professional organization,
- directly chamber or professional organization of the instructors for dual education.
- The employer conducting practical training in the dual education, which has more than 20 instructors, through teacher preparation instructors for dual under the authority of by professional or professional organization.

Professional organization may, acting to adjust the scale for instructors authorization indication employer, for which the proxy holder provide for instructors to dual (e.g., By determining sectors, the focus of the guild, chamber or the like.).

The total extent of preparing "major" instructors for system of dual education is 40 lessons and **educational program is aimed at:**

#### **I. Practical training with an employer - 2 lessons**

- practical training with an employer.
- performance requirements of practical training,
- instructor of practical training,
- Law on Vocational Education and Training,
- Decree on vocational training and substantive scope of the training,
- Decree on secondary schools.
- ability of the employer to provide practical training.
- training and productive work of students,
- measures to ensure health and safety in practical teaching.

#### **II. Planning and organization of practical training - 6 lessons**

- organization, scope and performance of practical training
- educational standards for practical training for a particular course of study or the relevant field of study
- a model curriculum (VUP) for a particular study area or a model curriculum for the relevant field of study and sample curricula (VUO) for vocational training, professional experience and artistic practice of the study program or a model curriculum for vocational training, professional experience or artistic practice of the branch of learning
- a thematic shift key education plan
- documentation of practical training
- coordinating the practical and theoretical instruction
- manner in which the instructor for evaluation and classification of pupils
- material and financial support of pupil
- apprenticeship contract.

### **III. Implementation work with students on practical training - 14 lessons**

- accompany the student instructor on practical training so that the student was at the end of their studies ready and motivated to perform chosen profession and was ready to move into the workforce and life
- understanding of student and instructor as a prerequisite for the success of transmitting and receiving information, respect and knowledge of the pupil's personality.
- communication with the student, his legal representative, with a school in a variety of situations and locations,
- motivation for a common goal, awakening, maintain student motivation for chosen profession, personality development of pupils,
- methodology and didactics.
- safeguard the rights and obligations of the student in the practical teaching.

Preparation of "master" instructor is organized in two phases. The first phase consists of a two-day training focused on the module I and module II .. The second phase consists of one-day training focused on the module III., Which also includes the completion of the instructors - written test. The first phase and second phase of the preparation of "head" instructor undergo two weeks form a spacer of the instructors (self), during which the contents of the instructor consulted for the preparation of a lecturer.

### **3.2. Designing the educational programs for “authorised” in company trainers for system of dual education**

Preparation of “authorised” in company trainers for system of dual education provides employer who is providing the practical training in system of dual education for pupils:

- through „master“, who is his employee, under the authority of professional organization,
- through VET trainer, which is its employees performing activities "master" instructor, under the authority of professional organization,
- through the organization (association, chamber, guild, etc.) with the teacher of the instructors for dual under the authority of professional organizations if requested by the employer

The total range of preparation is 8 lessons and educational program is aimed on:

#### ***I. Practical training with an employer - 1 lesson***

- practical training with an employer
- performance requirements of practical training
- instructor of practical training
- training and productive work of students
- measures to ensure health and safety in practical teaching

## ***II. Planning and organization of practical training - 1 lesson***

- organization, scope and performance of practical training
- educational standards for practical training for a particular course of study or the relevant field of study
- a model curriculum (VUP) for a particular study area or a model curriculum for the relevant field of study and sample curricula (VUO) for vocational training, professional experience and artistic practice of the study program or a model curriculum for vocational training, professional experience or artistic practice of the branch of learning
- a thematic shift key education plan
- documentation of practical training
- coordinating the practical and theoretical instruction
- manner in which the instructor for evaluation and classification of pupils
- material and financial support of pupil
- apprenticeship contract

## ***II. Implementation work with students on practical lessons - 6 lessons***

- accompany the student instructor on practical training so that the student was at the end of their studies ready and motivated to perform chosen profession and was ready to move into the workforce and life
- understanding of student and instructor as a prerequisite for the success of transmitting and receiving information, respect and knowledge of the pupil's personality
- communication with the student, his legal representative, with a school in a variety of situations and locations
- motivation for a common goal, awakening, maintain student motivation for chosen profession, personality development of pupils
- methodology and didactics
- safeguard the rights and obligations of the student in the practical teaching

## Programs of further education – examples

### 1. Engineering

| <b>Further education of VET teachers and trainers</b> |   |
|---|---|
| kind of education                                     | innovative education  |
| Group of study branches                               | 24 engineering  |
| Study branch  | <b>2411 K tool setter</b>   |
| Year of study /subject                                |   |
| Topic:  | Realization of automation technology in the educational field for topics 3, 4 and 6 for the metalworking profession - planning, commissioning, maintenance of machinery   |
| Length  | (3 days)  |
| Place   |   |
|   |   |
| Target group  | VET teachers and trainers   |
| Aim   | Elaboration of the basis for the implementation of educational zones 3, 4 and 6 for industrial mechanics  |
| Agenda  | <ul style="list-style-type: none"> <li>- planning, installation, commissioning and ensuring the operation of pneumatic, electro-pneumatic and digital control systems</li> <li>- optimizing the management with regard to safety, quality, productivity and energy consumption</li> <li>- calculating, measuring and displaying of physical quantities (pressure, force, volume, time, ...)</li> <li>- proposals (solution) model learning situations "BT", "BTL" and "BWT" - methodology of demonstration of experiments</li> <li>- Projects:               <ul style="list-style-type: none"> <li>- clamping - forming material - a combination of control</li> <li>- clamping - drilling - pulse control</li> <li>- feed stations</li> </ul> </li> </ul> |
|   |   |
| Guarantee   |   |
| Lecturers   |   |
|   |   |
| Notes   |   |
|   |   |

| <b>Further education of VET teachers and trainers</b> |   |
|---|---|
| kind of education                                     | innovative education  |
| Group of study branches                               | 24 engineering  |
| Study branch  | <b>2412 K mechanic of numerically controlled machines</b><br><b>2426 K machinery and equipment programmer</b>   |
| Year of study /subject                                |   |
| Topic:  | Realization of automation technology in the educational field for topics 6 and 14 for the metalworking profession - planning, commissioning, maintenance of machinery   |
| Length  | (3 days)  |
| Place   |   |
|   |   |
| Target group  | VET teachers and trainers   |
| Aim   | Processed materials for topics 6 and 14 for industrial mechanics  |
| Agenda  | <ul style="list-style-type: none"> <li>- create learning situations for "BTW" and "BTL" teaching in the context of complex activities and project methods of the "NAMUR"</li> <li>- methods of experimental management "BTW" and "BLT" and "GRACEF" for impulse control</li> <li>- management, measurement and regulation of PC with a serial / UBS, Parallel and Ethernet</li> <li>- measuring of energy consumption, calculation and evaluation (energy monitoring)</li> <li>- conditioning for the PC (conditioning monitoring)</li> <li>- conduct / safety management in a power failure, restore energy, and in case of emergency</li> </ul> <p>Acquaintance of:</p> <ul style="list-style-type: none"> <li>- Interface (PADAC, EDAC, EasyPort)</li> <li>- Software (FluidLab, FluidSim tires, FluidSim Hydraulic LabWiew, Step7, TIA Portal, Promod-Pro)</li> <li>- Sensors (force, pressure, flow etc.)</li> </ul> |
|   |   |
| Guarantee   |   |
| Lecturers   |   |
|   |   |
| Notes   |   |
|   |   |

| <b>Further education of VET teachers and trainers</b> |   |
|---|---|
| kind of education                                     | innovative education  |
| Group of study branches                               | 24 engineering  |
| Study branch  | <b>2433 H metal worker</b>  |
| Year of study /subject                                |   |
| Topic:  | Driving and gear equipment, assembling gears, drive Planning  |
| Length  | (3 days)  |
| Place   |   |
|   |   |
| Target group  | VET teachers and trainers   |
| Aim   | Basic information about driving and gear equipment  |
| Agenda  | <ul style="list-style-type: none"> <li>- Transmission technology: composition, structure and use</li> <li>- Workshop assembly transfers</li> <li>- Designing power units</li> <li>- Drive applications</li> <li>- DASM (asynchronous motors), frequency converter</li> <li>- Putting into operation of the belt conveyer</li> </ul> |
|   |   |
| Guarantee   |   |
| Lecturers   |   |
|   |   |
| Notes   |   |
|   |   |



| <b>Further education of VET teachers and trainers</b> |   |
|---|---|
| kind of education                                     | innovative education  |
| Group of study branches                               | 24 engineering  |
| Study branch  | <b>2423 H toolmaker</b>   |
| Year of study /subject                                |   |
| Topic:  | Scanning measurement techniques and generative creation of the product, the rapid creation of prototypes, 3D printing   |
| Length  | (3 days)  |
| Place   |   |
|   |   |
| Target group  | VET teachers and trainers   |
| Aim   | <ul style="list-style-type: none"> <li>- presentation and processing of methods selected for scanning workpieces and equipment</li> <li>- the application of scanning methods for the measurement and quality assurance with the appropriate software solution</li> <li>- processing of records and their use in the production of products, sample reverse engineering and business planning</li> <li>- didactic elaboration of appropriate software solutions and their application in the educational process</li> </ul> |
| Agenda  | <ul style="list-style-type: none"> <li>- technology of selected scanning procedures and basics</li> <li>- the application and implementation of selected practical examples through specialized companies</li> <li>- elaboration of learning situations and teaching evaluation</li> <li>- practical demonstrations and exercises various methods and programs</li> </ul>   |
|   |   |
| Guarantee   |   |
| Lecturers   |   |
|   |   |
| Notes   |   |

## 2. Electrical engineering

| <b>Further education of VET teachers and trainers</b> |   |
|---|---|
| kind of education                                     | innovative education  |
| Group of study branches                               | 26 electrical engineering   |
| Study branch  | <b>2679 K mechanic - mechatronic</b>  |
| Year of study /subject                                | 3 <sup>rd</sup> level/mechatronics, training  |
| Topic:  | pneumatic, electro-pneumatic and digital control systems  |
| Length  | (3 days)  |
| Place   |   |
|   |   |
| Target group  | VET teachers and trainers   |
| Aim   | Information about the latest in pneumatic, electro-pneumatic and digital control systems. Samples of usable teaching methods and teaching aids in the teaching process.   |
| Agenda  | electro-pneumatic and digital control systems <ul style="list-style-type: none"> <li>• optimization of control systems with regard to safety, quality, productivity, energy consumption</li> <li>• calculation and determination of measurement of physical quantities (pressure, force, volume, time, ...)</li> <li>• creation of teaching methodologies and examples for demonstration experiments</li> </ul> |
|   |   |
| Guarantee   |   |
| Lecturers   |   |
|   |   |