

CORE CURRICULUM OF VOCATIONAL TRAINING

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CNC machine tool operator 722307

Vocational education is aimed to prepare learner for life in the contemporary world, pursue professional activities and function actively on the changing labour market.

The tasks of a school and other entities offering vocational education and the manner of their accomplishment depend on changes in the economic and social environment that are affected in particular by: the idea of knowledge-based economy, globalisation of economic and social processes, growing share of the international trade, geographical and occupational mobility, new techniques and technologies, as well as growing expectations of employers in respect to employees' level of knowledge and skills.

Important elements of the vocational education include integration and correlation of comprehensive and vocational education, including improvement of key competences acquired in the comprehensive education process, taking into account lower stages of education. Appropriate level of general knowledge linked with vocational knowledge will contribute to increase of the level of vocational skills of graduates from schools offering vocational education and will ensure a possibility of facing up challenges of the changing labour market.

The process of vocational education includes activities that support development of every learner according to their needs and possibilities, taking into account in particular individual educational and career paths, possibilities to raise own educational level and professional qualifications and preventing premature termination of education.

Flexible response of the system of vocational education to the needs of the labour market, that is openness to lifelong learning and educational and occupational mobility of graduates is to be supported by separation of qualifications within the scope of individual professions included in the classification of professions of vocational education.

1. OBJECTIVES OF EDUCATION FOR A PROFESSION

A graduate of a basic vocational school for cutting tool operators should be prepared to perform the following professional tasks:

1) Preparing traditional and CNC machine tools for machining;

2) machining by means of traditional machine tools in compliance with requirements of technological documents;

3) machining by means of CNC machine tools in compliance with requirements of technological documents.

2. LEARNING OUTCOMES

For the purpose of accomplishment of the above mentioned professional tasks, it is essential that learners achieve the learning outcomes that include:

1) Learning outcomes in force for all professions;

Work safety (BHP)

Learner:

1) understands terms related to work safety, fire protection, environmental protection and ergonomics;

2) understands tasks and rights of work safety and environmental protection institutions and services in Poland;

3) defines rights and obligations of an employee and an employer in respect to work safety;

4) foresees threats for human life and health, property and environment in relation to accomplishment of professional tasks;

5) defines threats related to presence of harmful factors in work environment;

6) determines the consequences of impact of harmful factors on a human body;

7) organises a position of work in compliance with the applicable ergonomic requirements, provisions on work safety, fire protection and environmental protection;

8) uses personal and collective protection equipment when performing their professional duties;

9) complies with work safety principles and enforces legal provisions on fire protection and environmental protection;

10) provides first aid measures to victims of accidents at work and in a conditions threatening employee's health and life.

Undertaking and conducting business activity (PDG).

Learner:

- 1) uses terms from the area of market economy;
- 2) complies with labour law provisions, provisions on personal data protection, fiscal and copyright provisions;
- 3) complies with provisions concerning business activity;
- 4) knows business entities and institutions in the industry and relationships among them;
- 5) analyses activities conducted by business entities in the industry;
- 6) initiates joint ventures with various business entities in the industry;
- 7) prepares documents necessary for start up and maintenance of business activity;
- 8) conducts correspondence related to business activity;
- 9) handles office equipment and makes use of computer programmes supporting business activity;
- 10) plans and undertakes marketing activities related to the business activity conducted;
- 11) ensures optimisation of costs and revenues of conducted business activity.

Occupation-oriented foreign language (JOZ).

Learner:

- 1) uses resources of linguistic means (lexical, grammatical, spelling and phonetic) that facilitate accomplishment of professional tasks;
- 2) interprets utterances related to accomplishment of typical professional activity, that are pronounced slowly and articulately in the standard form of a language;
- 3) analyses and interprets short written text on accomplishment of typical professional activities;

4) says and writes short and understandable utterances and written texts facilitating communication in the place of work;

5) uses sources of information in foreign language.

Personal and social competence (KPS).

Learner:

1) complies with standards of conducts and ethical standards;

2) is creative and consistent when accomplishing tasks;

3) foresees consequences of undertaken activities;

4) is open to changes;

5) knows how to cope to manage stress;

6) updates his/her knowledge and professional skills;

7) keeps trade secrets;

8) can hold responsibility for undertaken activities;

9) can negotiate terms and conditions of agreements;

10) cooperates within a team.

2) Learning outcomes common for all professions in the mechanical and mining and metallurgical areas, that serve as frameworks for education in the following occupations or groups of occupations PKZ(M.a), PKZ(M.b) and PKZ(M.h);

PKZ(M.a) Skills that serve as frameworks for education in the occupation of: mechanic and operator of agricultural vehicles and machines, watchmaker, optician-mechanic, precision mechanic, industrial automation and precision instrument mechanic, mechanic - assembler of machines and instruments, car mechanic, cutting tool operator, iron-worker, blacksmith, hull assembler, panel beater, sheet-metal worker, sprayer, optical technician, aircraft technician, ship technician, ship construction technician, automobile technician, agricultural mechanisation technician, mechanical technician, mechatronics assembler, automobile electromechanical technician, mechatronics technician, road transportation technician, power engineering technician, casting modeller, drilling technician, underground mining technician, borehole mining technician, open-pit mining technician, solid

minerals processing technician, casting technician, steel work technician, casting machine and device operator, metallurgical machine and device operator, forming machine and device operator, plastic processing machine and device operator, goldsmith - jeweller, motor mechanic, refrigerator technology and air conditioning technician, lifting device technician

Learner:

- 1) complies with principles of engineering drawing;
- 2) prepares sketches of machine parts;
- 3) prepares technical drawings by means of computer techniques;
- 4) knows parts of machines and instruments;
- 5) knows types of connections;
- 6) complies with matching and tolerance principles;
- 7) knows construction materials and consumables;
- 8) knows means of internal transportation;
- 9) selects appropriate forms of transportation and storage of materials;
- 10) recognizes types of corrosion and determines manners of anti-corrosion protection;
- 11) knows techniques and methods of production of machines and instruments;
- 12) knows machines, instruments and tools of manual and machine treatment;
- 13) knows measurement devices used for manual and machine treatment;
- 14) takes measurements in a workshop;
- 15) knows quality control methods of conducted works;
- 16) defines construction and complies with principles of operation of machines and instruments;
- 17) makes use of technical documentation of machines and instruments and complies with norms of technical drawings, machine parts, construction materials and consumables;
- 18) uses computer programmes supporting performance of tasks.

PKZ(M.b) Skills that serve as frameworks for education in the occupation of: mechanic and operator of agricultural vehicles and machines, mechanic - assembler of machines and instruments, traditional

machine tools operator , automobile technician, agricultural mechanisation technician, mechanical technician, mechatronics assembler, mechatronics technician

Learner:

- 1) applies laws and complies with principles of technical mechanics, electrical engineering, electronics and automation;
- 2) selects tools and measurement instruments appropriate for assembly and disassembly of machines and instruments;
- 3) performs works related to manual and machine metal working;
- 4) uses computer programmes supporting performance of task.

PKZ(M.h) Skills that serve as frameworks for education in the occupation of: machine tool operator, mechanical technician

Learner:

- 1) makes calculation related to machining;
 - 2) knows various control systems of machine tools;
 - 3) uses computer software supporting performance of tasks.
- 3) learning outcomes corresponding to qualifications defined for the profession of machine tool operator, as defined in part II:

M.19. Operation of machine tools

1. Preparation of traditional machine tools for work

Learner:

- 1) knows various machine tools;
- 2) selects proper machine tools that meet requirements of treatment, production, form and size of treated items;
- 3) knows various types of machining;
- 4) in technical documents recognizes the way of positioning and fixing of a treated item;
- 5) recognizes elements of the cutting edge of a cutting tool and its geometry;
- 6) selects cutting tools that correspond to properties of treated material, type of treatment and a machine tool;
- 7) selects cutting parameters that corresponds to machining-related actions;
- 8) selects tools and measurement instruments taking account of accuracy of treatment of treated items;
- 9) equips machine tools with holders and cutting instruments corresponding to the type of performed actions and in compliance with technological documents.

2. Operation of traditional machine tools

Learner:

- 1) checks if machines tools works in compliance with documentation;
- 2) fixes cutting tools in holders;
- 3) sets and fixes items to be cut in holders and holding devices;
- 4) sets treatment parameters in compliance with technological documentation;
- 5) starts machine tool and control the cutting process;
- 6) performs machining operations in compliance with technological documentation;
- 7) recognizes phenomena related to cutting tool edge impact on a treated item;
- 8) replaces cutting tools after or within machining process;

- 9) controls the machining process;
- 10) makes use of measurement tools and instruments;
- 11) maintains traditional machine tools.

3. Prepares CNC machine tools for operation

Learner:

- 1) recognizes characteristic items of CNC machine tools;
- 2) knows sub-programmes and machining cycles in programmes and control systems of CNC machine tools;
- 3) in the technological documentation recognized specifications and data necessary to set machine tools;
- 4) knows the meaning of key works in machining programmes;
- 5) uses programming language code to edit machining programmes;
- 6) selects measurement instruments to check items after machining;
- 7) selects tool holders to set and fix cutting tools;
- 8) fixes tool holders and cutting items in tool sockets or places them in a tool box of a CNC machine tool;
- 9) determines corrective values of cutting tools and enters them to the controller of a CNC machine tool before a machining programme is launched;
- 10) enters a technological treatment programme to the controller of a CNC machine tool;
- 11) tests technological treatment programmes on to CNC machine tools.

4. Operation of CNC machine tools

Learner:

- 1) sets and enters zero point shift;

- 2) sets and fixes items to be treated;
- 3) launches CNC machine tools for manual and automatic work;
- 4) performs machining by means of CNC machine tools;
- 5) supervises the course of machining and responses to messages sent by the control system of a CNC machine tool;
- 6) evaluates tear and wear of a cutting edge;
- 7) replaces a cutting edge in case of too excessive tear and wear or damage;
- 8) corrects cutting results;
- 9) controls dimensions of items after machining;
- 10) performs maintenance of CNC machine tools.

3. CONDITIONS OF VOCATIONAL EDUCATION

A school that decides to offer education of machine tool operators should have the following didactic classes:

1) technical drawing classroom equipped with: computer station for the teacher, that is connected to a local network with access to the Internet, a printer, a scanner and multimedia projector; computer station (one station for one student), all computers connected to a local network with access to the Internet, package of office programmes, programme making technical drawings, didactic aids developing spatial imagination, norms concerning principles of machine drawings;

2) mechanical technology classroom equipped with: computer station for the teacher, that is connected to a local network with access to the Internet, a printer, a scanner and multimedia projector; lathe, table milling machine, workbench with a vice, models and mechanisms and assembles of machine tools, assembly tools and devices, instruments to measure lengths and angles of machine parts, marking tools and instruments, machine cutting tools, manual cutting tools, machining norms, technical documents for cutting tools, examples of technological documents;

3) classroom for CNC machine tool programming equipped with: computer station for the teacher, that is connected to a local network with access to the Internet, a printer, a plotter, a scanner and multimedia projector; computer station (one station for one student), lathe with a steering system, milling machine with a control system or machining centre, programming simulator, simulation

programmes of cutting tool work in CAD/CAM system (Computer Aided Design/Computer Aided Manufacturing) with postprocessors for cutting tools, treatment holders and instruments, tool measuring probes, handling tools, technical documents of cutting tools, catalogues of holders and devices, tool holders, cutting tools, machining norms;

4) school workshops equipped with: traditional machine tools (universal lathes, universal milling machines), grinder and polishing machines, grinders for surfaces, rollers and holes, milling machine for bevel gears, shaper, radial drill, slotting machine, machining tools, measurement instruments, handling tools, catalogues of machining tools, instruments and holders and tool holders, examples of technical documents of cutting tools, machining norms, personal protection equipment.

Practical training may take place in: school workshops and classes, adult educational institutions, practical training centres and entities that may potentially serve as a place of employment for graduates from schools providing education in this profession.

4. Minimum number of hours of vocational education 1)

Learning outcomes common for all professions in the mechanical and mining and metallurgical areas, that serve as frameworks for education in the following occupations or groups of occupations	400 hours
M.19 Use of machine tools	650 hours

1) The number of vocational education in school should be adjusted to the number of hours defined in the provisions concerning curriculum in public schools in respect to vocational training, while the minimum number of hours specified in the table for learning outcomes of education: common for all professions in the areas of education that serve as frameworks for education in the occupations or groups of occupations and appropriate for qualifications specified for the occupation.

5. POSSIBILITIES TO ACQUIRE ADDITIONAL QUALIFICATIONS FOR THE OCCUPATIONS IN THE AREA OF EDUCATION DEFINED IN CLASSIFICATION OF OCCUPATIONS OF VOCATIONAL EDUCATION

A graduate from a school training machine tools operators, awarded qualification M19. *Use of machine tools* may be awarded a diploma of *mechanic technician* after receiving the qualification

M.44. *Organisation and supervision of production processes of machines and instruments* and after completion of secondary education.