



CNC operator

1. Name of qualification	CNC Operator, beginner level
2. Sector of the national economy	Metalworking, manufacturing, forestry Related professions: CNC setter, 4 NQF
3. Qualification level:	3 NQF Individually or in a team, following the instructions of a qualified specialist, perform certain simple works with equipment and be responsible for the results of the work performed. Prepare and use the tools, machinery and equipment necessary for the performance of the specified work according to the instructions, set and adjust simple equipment and make the necessary parts. Set up, adjust and apply quality control measuring instruments, ensure compliance of the results of your work with certain quality requirements or drawings. Demonstrates basic knowledge and skills in practice, does not make decisions independently, professional experience does not exceed 1 year.
4. Description of profession/occupation:	NC operator performs the production of metal or composite material parts, by controlling the quality of the manufactured part, the technological process and its parameters and tools. <u>Regulation of the profession, additional requirements:</u> Qualification and professional competence are certified in accordance with the requirements of international standards and regulatory acts of national country. Main tasks: <ol style="list-style-type: none"> 1. Understand the task and technical documentation of CNC machine. 2. Preparation of tools, auxiliary devices and materials for the processing of metal or composite parts 3. Preparation of the CNC machine for the technological process. 4. Prototyping of serial production parts and production of metal or composite parts. Professional knowledge <u>At the conceptual level:</u> <ol style="list-style-type: none"> 1. Types of anti-corrosion means for metal, conditions of their usage. 2. Ways and techniques of packing the



- manufactured parts.
3. Types and techniques of storage of manufactured parts.

At the level of understanding:

1. Principles of setting up a safe workplace.
2. Reading of technical drawings.
3. Figurative geometry. Basics of technical graphics.
4. Principles of organizing the workplace of CNC operator.
5. Requirements of the user manual for CNC machine.
6. Principles of application of metal processing programs.
7. Chemical, physical, main mechanical, technological and operational properties of metals and composite materials and their alloys.
8. Classification of metals and composite materials.
9. Quality requirements for materials used in metal and composite material processing works.
10. Types of tools and cutting tools.
11. Techniques for using catalogs and smart programs in tool selection.
12. CNC machine maintenance data recording requirements.
13. Operating principles and technological possibilities of CNC machine.
14. Metal cutting technologies.
15. Types and modes of metal processing. Turning. Milling.
16. Coordinate cutting of sheets. Folding.
17. Grinding.
18. Principles of creating simple part machining programs.
19. Manual programming languages for simple machining programs.
20. Location and meaning of the keys on the control panel keyboard.
21. Principles of surface roughness assessment.
22. Methods of determining the degree of wear of cutting tools.

At the usage level:

1. Conditions of selection and use of individual and collective protective measures.
2. Requirements for the use of collective protective measures.
3. Principles of placement of parts.



4. Operations intensity calculations.
5. Reading technical sketches and drawings.
Reading of bases, dimension chains, tolerances, seats, surface roughness designations in drawings.
6. Methods of using tables of bases, dimension chains, tolerances, seats, surface roughness designations.
7. Methods of using protection equipment for program control metalworking machine tools.
8. Methods of manual inspection of the CNC machine processing zones.
9. Methods of checking the conformity of processing modes.
10. Methods of removing metal shavings - basic material clean treatment, rough treatment.
11. Principles of sequence planning of metal and composite parts processing works.
12. Planning the manufacturing process of the part.
13. Principles of planning the use of measuring instruments.
14. Use of programming languages of CNC machine.
15. Terms of use of technological liquids.
16. Techniques for preparing coolants.
17. Requirements of CNC machine tools operation and electrical safety rules.
18. Ergonomic working methods.
19. Methods of performing routine and scheduled maintenance of CNC machine.
20. Methods of fixing tools in the machine tool.
21. Techniques of fixing auxiliary devices, types and techniques of fixing workpieces.
22. Principles of using the keyboard of the control panel of the CNC machine.
23. Data transfer techniques.
24. Application of measuring instruments and measuring devices.
25. The technology of measuring parts.
26. Principles of calculation of tool correction.
27. Calculation methods for metal and composite materials.
28. Methods of determining the specific gravity of metal and composite materials.
29. Requirements for filling out the documentation for accounting of manufactured parts.

General knowledge

1. Professional terminology.



2. Calculations.
3. Operating principles of computer and office equipment.
4. Principles of planning and decision-making.
5. Work sequence planning.

Skills and attitudes: (what the employee can do)

1. Use individual and collective means of protection.
2. Use harmless and safe work techniques in the work process.
3. Maintain the workplace of the CNC operator in order.
4. Familiarize yourself with the task of processing metal or composite materials.
5. Read technical sketches and drawings of the work to be done.
6. Familiarize yourself with the operating instructions of CNC machine
7. Familiarize yourself with the requirements specified in the technological map of the metal or composite part manufacturing process.
8. Familiarize yourself with the processing program of the specific part.
9. Prepare workpieces appropriate for the work to be performed.
10. Prepare technological fluids suitable for the work to be performed.
11. Prepare appropriate tools for the work to be done.
12. Prepare technological equipment and auxiliary devices according to the work task
13. To give proposals for setting up an ergonomic work environment.
14. Perform daily technical maintenance of CNC machine.
15. Prepare a program in CNC machine for the production of a specific product.
16. Open the appropriate metal or composite material processing program for the task.
17. Enter the parameters of the processing program corresponding to the work task.
18. Check metal or composite machining programs in graphical representation (simulation).
19. Determine the amount of material required for serial production of parts.
20. Fill in the accounting documentation of the manufactured metal and composite material parts.
21. Prepare the produced metal or composite parts for transfer or storage according to the requirements specified in the technological map.



	<p>Competences</p> <ol style="list-style-type: none"> 1. Ability to responsibly use individual and collective protective equipment. 2. The ability to maintain the workplace in order. 3. The ability to understand the metal or composite material processing task to be performed, according to the amount of work to be performed and the processing time of the part. 4. Ability to read technical sketches and drawings of the work to be performed, according to the task. 5. Ability to comply with the conditions of the instructions for use of the CNC machine. 6. The ability to assess the technical conditions of the CNC machine to the work to be performed. 7. Ability to get familiar with and follow the conditions of the technological map of the manufacturing process of a metal or composite material part. 8. Ability to get acquainted with the processing program of the specific part. 9. Ability to perform routine maintenance of a CNC machine. 10. The ability to prepare a program in CNC machine for the production of specific products. 11. Ability to develop and enter a simple machining work program appropriate to the work task. 12. Ability to test metal or composite parts processing programs in graphical representation (simulation). 13. The ability to check the quality and size of serial production parts according to the conditions of the work task. 14. The ability to determine the amount of materials and consumables for the production of serial parts, assessing their compliance with quality requirements. 15. The ability to fill in the accounting documentation of manufactured parts.
<p>5. Requirements for obtaining a qualification:</p>	<p>Obtained professional qualification.</p> <p>FORMAL REQUIREMENTS for documenting education: certificate of vocational education/qualification certificate. In addition, the employer may request/want: other diplomas, certificates, certificates proving qualifications that are useful for the CNC operators profession</p>
<p>6. Ways to obtain qualifications:</p>	<p>To learn in professional education schools. To learn in a working environment, through self-study, proving the knowledge, skills and competences acquired as</p>



	<p>a result of outside formal education and passing a qualification exam.</p>
7. Criteria for evaluating competencies:	<p>Testing/assessing the learning outcomes (knowledge, skills and competences) required to perform simple/not too complex professional tasks in the workplace includes 4 sets of learning outcomes.</p> <p>Understand the task and technical documentation of CNC machine. Employee Criteria</p> <ol style="list-style-type: none">1. understands the metal or composite material processing task to be performed;2. reads technical sketches and drawings of the work to be performed;3. familiarizes himself with the requirements of the user manual for CNC machine;4. evaluates the technical condition of CNC machine to the work to be performed;5. understands the machining program for production of specific part. <p>Preparation of tools, auxiliary devices and materials for the processing of metal or composite parts Employee Criteria</p> <ol style="list-style-type: none">1. prepares workpieces appropriate for the work to be performed;2. prepares appropriate technological fluids and tools for the work to be performed;3. prepares technological equipment and auxiliary devices according to the work task. <p>Preparation of the CNC machine for the technological process. Employee Criteria</p> <ol style="list-style-type: none">1. prepares CNC machine for production of products;2. enters a processing program appropriate to the task;3. checks the metal or composite material processing program in the graphical representation (simulation). <p>Prototyping of serial production parts and production of metal or composite parts Employee</p>



	<p>Criteria</p> <ol style="list-style-type: none">1. performs adjustment of the cutting tools according to the results of the inspection of the serial production part;2. determines the amount of material required for serial production of parts;3. fills in the accounting documentation of the manufactured metal and composite material parts;4. prepares the produced metal or composite parts for transfer or storage according to the requirements specified in the technological map.
8. Methods of assessment of the competences forming the qualification:	Employee self-assessment Examination of the employee's knowledge Testing of employees' practical skills
9. Career opportunities for a person who has acquired the qualification:	Continue to improve skills and abilities in the work environment. Learn different programming CNC machine languages. Get a higher level qualification.

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