



NATIONAL QUALIFICATION

12UY0082-5

CNC PROGRAMMER

LEVEL 5

REVISION NO: 01

AMENDMENT NO: 01

VOCATIONAL QUALIFICATIONS AUTHORITY

Ankara, 2019

PREFACE

CNC Programmer (Level 5) National Qualification was prepared by the Ankara Chamber of Industry assigned by the VQA in accordance with the provisions of the Regulation on the Development of National Occupational Standards and National Qualifications published in the Official Gazette No.29507 and dated 19/10/2015, and the Regulation on the Procedures and Principles for the Establishment, Duties, and Operation of the Vocational Qualifications Authority Sector Committees published in the Official Gazette No.25713 and dated 27/11/2007 and assessed after receiving the opinions of relevant institutions and organizations in the sector, and approved by the VQA's Executive Board upon being examined by the VQA's Machinery Sector Committee.

CNC Programmer (Level 5) National Qualification has been revised by Decision No.2019-83 and dated 27.06.2019 of the VQA Executive Board.

The CNC Programmer (Level 5) National Qualification has been amended by the decision of the Presidency dated 10.06.2020 and numbered 1570.

Vocational Qualifications Authority

INTRODUCTION

The basic criteria for the development of national qualification, its examination by the sector committees, and its approval by the VQA Executive Board are specified in the Regulation on the Development of National Occupational Standards and National Qualifications.

The basic criteria for national qualifications are defined as follows:

- a) National qualifications shall be developed on the basis of national occupational standards or international standards.
- b) National qualifications shall be developed with a participatory approach and the opinions and contributions of relevant parties shall be received.
- c) National qualifications cover matters related to occupational health and safety, environmental safety and quality, regarding the occupational field.
- d) National qualifications shall be written to be understood by users.
- e) National qualifications encourage individuals to develop themselves and make progress in the occupation, within the framework of the lifelong learning principle.
- f) National qualifications do not contain any discriminative components, either explicit or implicit.
- g) National qualifications include components that ensure measuring the knowledge, skills, and competency of individuals within the scope of quality assurance.

12UY0082-5 CNC PROGRAMMER NATIONAL QUALIFICATION

1	NAME OF THE QUALIFICATION UNIT	CNC Programmer
2	REFERENCE CODE	12UY0082-5
3	LEVEL	5
4	PLACE IN THE INTERNATIONAL CLASSIFICATION	ISCO 08: 3115
5	TYPE	-
6	CREDIT VALUE	-
7	A) PUBLICATION DATE	26.09.2012
	B) REVISION NO / AMENDMENT NO	Revision No: 01 Amendment No: 01
	C) REVISION/AMENDMENT DATE	Revision No 127.06.2019- 2019/83 Amendment No. 01 10/06/2020-1570
8	AIM	<p>This qualification has been developed to ensure that the CNC Programmer (Level 4) occupation is carried out by skilled people and to enhance the quality of the works towards the purposes of;</p> <ul style="list-style-type: none"> Defining the qualifications, knowledge, skills, and competencies that the candidates should possess, Enabling candidates to prove their vocational qualification with a valid and reliable certificate, Providing reference and resource to the education system, testing and awarding bodies.
9	OCCUPATIONAL STANDARD(S) THAT FORM(S) THE BASIS FOR THE QUALIFICATION UNIT	<p>12UMS0216-5 CNC Programmer (Level 5) National Occupational Standard 12UMS0216-5 CNC Programmer (Level 5) National Occupational Standard</p>
10	REQUIREMENT(S) FOR ENTERING THE QUALIFICATION EXAM	-
11	STRUCTURE OF QUALIFICATION	
	11-a) Mandatory Units	<p>18UY0082-5/A1 Occupational Health and Safety, Environmental Safety and Quality 12UY0082-5/A2 Programming and Production in CNC Machines</p>
	11-b) Elective Units	-
	11-c) Alternatives for Grouping Units and Additional Learning Outcomes	The candidate must succeed in all of the compulsory qualification units to receive the qualification certificate.
12	ASSESSMENT AND EVALUATION	The candidates willing to achieve the CNC Programmer (Level 5) Vocational Qualification Certificate are subjected to theoretical and practical exams defined in the units. In order for the candidates to achieve

<p>the qualification certificate, they must succeed in both theoretical and practical exams.</p> <p>Theoretical and practical exams in the qualification units can be done separately for each unit or together. However, each unit must be assessed independently.</p> <p>The validity period of qualification units is 2 years from the date of achievement of the unit. In order to achieve a qualification by combining the qualification units, all units must remain valid.</p>		
13	VALIDITY PERIOD OF THE CERTIFICATE	The validity period of the qualification certificate is 5 years.
14	OBSERVANCE FREQUENCY	-
15	ASSESSMENT AND EVALUATION METHOD TO BE USED IN CERTIFICATE RENEWAL	<p>At the end of the validity period of five (5) years, the performance of the certificate holder shall be assessed using at least one of the methods defined below;</p> <p>a) Submitting records indicating that they worked in the relevant field for at least two years in total or for the last six months within the 5-year document validity period (such as service transcript, reference letter, contract, invoice, portfolio),</p> <p>b) Taking the practical exams defined for the qualification units within the scope of qualification.</p> <p>For the candidates with a positive assessment result, the validity period of the certificate shall be extended for another 5 years.</p>
16	ORGANIZATION(S) DEVELOPING THE QUALIFICATION	Ankara Chamber of Industry (ASO)
17	SECTOR COMMITTEE VERIFYING THE QUALIFICATION	VQA's Machinery Sector Committee
18	VQA EXECUTIVE BOARD'S APPROVAL DATE and NUMBER	26.09.2012 – 2012/69 First Revision: 27.06.2019-2019/83

**12UY0082-5/A1 OCCUPATIONAL HEALTH AND SAFETY, ENVIRONMENT AND QUALITY
QUALIFICATION UNIT**

1	NAME OF THE QUALIFICATION UNIT	Occupational Health and Safety, Environmental Safety and Quality
2	REFERENCE CODE	12UY0216-5/A1
3	LEVEL	5
4	CREDIT VALUE	-
5	A) PUBLICATION DATE	26.09.2012
	B) REVISION NO / AMENDMENT NO	Revision No: 01 Amendment No: 01
	C) REVISION/AMENDMENT DATE	Revision No 127.06.2019- 2019/83 Amendment No. 01 10/06/2020-1570
6	THE OCCUPATIONAL STANDARD THAT FORMS THE BASIS FOR THE QUALIFICATION UNIT	
12UMS0216-5 CNC Programmer National Occupational Standard		
7	LEARNING OUTCOMES	
<u>Learning Outcome 1: Explaining occupational health and safety, and environmental protection measures.</u>		
Performance Criteria:		
1.1: Defines legal and workplace rules regarding occupational health and safety.		
1.2: Explains mitigation of risk factors related to occupational health and safety.		
1.3: Explains the emergency procedures to be applied in case of danger.		
1.4: Explains environmental protection measures.		
<u>Learning Outcome 2: Describes the quality requirements of work processes and work environment.</u>		
Performance Criteria:		
2.1: Explains the methods for ensuring quality.		
2.2: Lists the faults and errors detected during operation.		
2.3: Explain how to direct their subordinates in the performance of the tasks.		
8	ASSESSMENT AND EVALUATION	
8 a) Theoretical Exam		
Multiple Choice Exam: The theoretical exam for the A1 unit shall be applied as per the "Information" checklist in Annex A1-2. The theoretical exam should be applied in the form of multiple-choice questions with at least 4 choices and a minimum of 25 questions with equal weight per examination. No points shall be deducted from the overall score for wrong answers to any of the questions and 1,5 minutes of time shall be granted for candidates for each question. A candidate who answers at least 60% of the questions correctly in the written examination shall succeed. The questions in the examination should measure all knowledge statements (ANNEX A1-2) intended to be measured by the theoretical exam in this unit.		
8 b) Practical Exam		
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8 c) Other Conditions Regarding Assessment and Evaluation		
The candidate must pass the T1 exam in order to be considered successful in the mentioned unit. The		

validity period of the qualification unit is 2 years from the date of achievement of the unit.		
9	INSTITUTION/ORGANIZATION(S) DEVELOPING THE QUALIFICATION UNIT	Ankara Chamber of Industry (ASO)
10	SECTOR COMMITTEE VERIFYING THE QUALIFICATION UNIT	VQA's Machinery Sector Committee
11	VQA EXECUTIVE BOARD APPROVAL DATE and NUMBER	26.09.2012 – 2012/69 First Revision: 27.06.2019-2019/83

QUALIFICATION UNIT ANNEXES

ANNEX A1-1: Information on the Recommended Training for the Awarding of the Qualification Unit

Candidates shall be recommended to complete a program with the below-described training content for this unit.

Training Content:

1. Occupational health and safety and environment
 - 1.1. Legal Legislation on Occupational Health and Safety
 - 1.2. Hazards and risks and the measures to be taken against them
 - 1.3. Emergencies and the tasks to be done in emergencies
 - 1.4. Alarm signals and danger signs
 - 1.5. Fire and fire protection
 - 1.6. Environmental protection measures
 - 1.7. Environment and environmental pollution
 - 1.8. Recyclable waste and measures to be taken regarding such waste.
 - 1.9. Hazardous waste
 - 1.10. Environmental risks arising from production
2. Quality Requirements
 - 2.1. Task documentation
 - 2.2. Requirements of quality management systems
 - 2.3. Keeping records
 - 2.4. Errors and faults that may occur during tasks, and methods for detecting such errors and faults.

ANNEX A1-2: Checklist to be Used in the Assessment and Evaluation of the Qualification Unit

a) INFORMATION

No.	Knowledge Statement	NOS-Related Department	Qualification Unit Performance Criteria:	Assessment Tools
INFO.1	Lists the rules on occupational health and safety	A.1.1	1.1	T1
INFO.2	Lists the personal protective equipment suitable for the job.	A.1.2 A.1.3	1.1 1.2	T1

No.	Knowledge Statement	NOS- Relate d Depart ment	Qualification Unit Performance Criteria:	Assessment Tools
INFO.3	Lists the rules on keeping the workstation and equipment in order.	A.1.4	1.1	T1
INFO.4	Lists the occupational health and safety protection and intervention tools.	A.1.4	1.1 1.2	T1
INFO.5	Lists the usage characteristics for occupational health and safety protection and intervention tools.	A.1.4	1.1 1.2	T1
INFO.6	Lists the warning signs and plates suitable for the performed work.	A.1.5	1.2	T1
INFO.7	List the hazards and risks associated with the work they carry out.	A.2.1	1.1 1.2	T1
INFO.8	Lists the measures to be taken for reducing the risk factors.	A.7.1 A.2.2	1.1 1.2	T1
INFO.9	Lists the potentially hazardous situations.	A.3.1	1.3	T1
INFO.10	Matches the dangerous situations that cannot be immediately averted with the relevant agencies that must be contacted.	A.1.6	1.3	T1
INFO.11	Lists the exiting or escaping procedures in cases of emergency.	A.1.5	1.3	T1
INFO.12	Lists the environmental impacts related to the conducted tasks.	A.2.1	1.4	T1
INFO.13	Lists the recyclable materials.	A.2.4	1.4	T1
INFO.14	Lists the sorting and classification of recyclable materials.	A.2.4 A.2.5	1.4	T1
INFO.15	Lists the dangerous and hazardous wastes.	A.2.3	1.4	T1
INFO.16	Lists the principles for the separation of dangerous and hazardous wastes from other materials.	A.2.3	1.4	T1
INFO.17	Lists the safe storage requirements for combustible and flammable materials.	A.2.1	1.4	T1
INFO.18	Lists the proper hardware, materials and equipment to be used against spills and leaks.	A.2.2	1.4	T1
INFO.19	Lists the principles for using business resources economically and efficiently.	B.3.2	1.4	T1
INFO.20	Lists the protective and preventive maintenance tasks for the used equipment.	A.3.1 B.4.1	2.1	T1
INFO.21	Lists the quality system requirements set forth in the instructions.	A.3.1 B.1.3	2.1	T1
INFO.22	Lists the tolerances and deviations allowed in practice.	A.3.1 B.1.3 C.1.2	2.1	T1
INFO.23	Lists the errors and faults that are likely to occur while working.	A.3.1	2.2	T1

No.	Knowledge Statement	NOS- Relate d Depar tment	Qualification Unit Performance Criteria:	Assessment Tools
INFO.24	Explain how to direct their subordinates in the performance of the tasks.	I.3.1 I.3.2	2.3	T1

12UY0082-5/A2 PROGRAMMING AND PRODUCTION IN CNC MACHINES

1	NAME OF THE QUALIFICATION UNIT	Programming and Production in CNC Machines
2	REFERENCE CODE	12UY0082-5/A2
3	LEVEL	5
4	CREDIT VALUE	-
5	A) PUBLICATION DATE	26.09.2012
	B) REVISION NO / AMENDMENT NO	Revision No: 01 Amendment No: 01
	C) REVISION/AMENDMENT DATE	Revision No 127.06.2019- 2019/83 Amendment No. 01 10/06/2020-1570
6	THE OCCUPATIONAL STANDARD THAT FORMS THE BASIS FOR THE QUALIFICATION UNIT	12UMS0216-5 CNC Programmer (Level 5) National Occupational Standard
7	LEARNING OUTCOMES	<p><u>Learning Outcome 1: Makes pre-work preparations.</u> Performance Criteria: 1.1. Checks the measurement and control tools. 1.2. Prepares the tools, apparatus and equipment to be used. 1.3. Adjusts the settings of the CNC Machines.</p> <p><u>Learning Outcome 2: Uses the relevant computer-aided design and manufacturing (CAD/CAM) program.</u> Performance Criteria: 2.1. Creates a solid model of the workpiece to be programmed. 2.2. Creates the tool paths of the work piece to be programmed with the CAM program.</p> <p><u>Learning Outcome 3: Programs the machine</u> Performance Criteria: 3.1. Decides on the CNC programming method. 3.2. Performs CNC Programming. 3.3. Makes a program suitable for three-dimensional coordinate systems (x, y, z, a, b, c). 3.4. Controls the CNC Program.</p> <p><u>Learning Outcome 4: Runs the CNC program on the machine.</u> Performance Criteria: 4.1. Sets the program on the automatic operation mode and runs it in a controlled manner. 4.2. Prepares the piece ready for serial production. 4.3. Turns off the machine.</p> <p><u>Learning Outcome 5: Applying the OHS, environmental and quality requirements.</u> Performance Criteria 5.1: Apply the OHS rules in the works they carry out. 5.2: Apply the environmental protection measures in the works they carry out. 5.3: Apply the quality requirements in the works they carry out.</p>
8	ASSESSMENT AND EVALUATION	
8 a) Theoretical Exam		
Multiple Choice Exam: The theoretical exam for the A2 unit shall be applied as per the "Information"		

checklist in Annex A2-2. The theoretical exam should be applied in the form of multiple-choice questions with at least 4 choices and a minimum of 20 questions with equal score values per examination. No points shall be deducted from the overall score for wrong answers to any of the questions and 1,5 minutes of time shall be granted to candidates for each question.

A candidate who answers at least 60% of the questions correctly in the theoretical exam shall be deemed successful.

The questions in the examination should measure all knowledge statements (Annex A2-2) intended to be measured by the theoretical exam in this unit.

8 b) Practical Exam

P1: The practical exam for the A2 unit is realized as per the "Skills and Competencies" checklist given in Annex A2-2. The critical steps that must be accomplished by the candidate shall be specified in the skills and competencies checklist. In order for a candidate to succeed in the practical exam, they should score at least 80 out of 100 points (80%) in the overall examination, provided that they succeed in all the critical steps. The duration of the practical exam should correspond to the time under actual practical conditions. The practical exam shall be carried out in a real or realistically arranged work environment. All expressions of skill and competency (Annex A2-2) should be measured with a practical exam.

8 c) Other Conditions Regarding Assessment and Evaluation

The validity period of the examinations foreseen for the unit shall be 1 year from the date of achievement of the examination.

In order to achieve the unit, the time between achieved examination dates cannot exceed one year.

The validity period of qualification units is 2 years from the date of achievement of the unit.

If the candidate displays a behavior that could jeopardize their own safety and the safety of others, the examination shall be terminated.

9	INSTITUTION/ORGANIZATION(S) DEVELOPING THE QUALIFICATION UNIT	Ankara Chamber of Industry (ASO)
10	SECTOR COMMITTEE VERIFYING THE QUALIFICATION UNIT	VQA's Machinery Sector Committee
11	VQA EXECUTIVE BOARD APPROVAL DATE and NUMBER	26.09.2012 – 2012/69 Revision No 1: 127.06.2019- 2019/83

QUALIFICATION UNIT ANNEXES

ANNEX A2-1: Information on Recommended Training for Acquisition of a Qualification Unit

Candidates shall be recommended to complete a program with the below-described training content for this unit.

Training Content:

1. Pre-work preparation tasks
 - 1.1. Selection of the measurement and control tools and checking their suitability for use.
 - 1.2 Use of measurement and control tools
 - 1.3. Procedures for determining and preparing tools, equipment, and materials suitable for the task
 - 1.4 Use of tools, equipment, and material
 - 1.5. CNC Machines and Setting on CNC Machines
 - 1.6 Use of CNC Machines
2. Computer-assisted design and manufacturing (CAD/CAM)
 - 2.1. Solid model creation tasks

- 2.2. Tool path preparation tasks
3. Machine programming tasks
 - 3.1. CNC programming methods
 - 3.2. CNC programming tasks
 - 3.3. Programming tasks suitable for three-dimensional coordinate systems (x, y, z, a, b, c).
 - 3.4. CNC program control tasks
4. Running the CNC program on the machine
 - 4.1. Running tasks of the program
 - 4.2. Preparation of the machine for serial production
 - 4.3. Turning off tasks of the machine
5. Occupational Health and Safety, Environmental Protection and Quality Requirements
 - 5.1. Implementation of OHS instructions in work processes
 - 5.2. Using personal protective equipment
 - 5.3. Requirements of using warning signs and plates
 - 5.4. Emergencies and the tasks to be done in emergencies
 - 5.5. Environmental protection requirements in the working environment
 - 5.6. Tasks to be performed regarding wastes generated in the working environment
 - 5.7. Implementing quality requirements
 - 5.8. Use of machinery, equipment, tools, and devices in accordance with quality requirements
6. Documents used during the tasks
 - 6.1. Work order and determination of order of task according to the work order
 - 6.2. Working drawing and determination of the order of task in accordance with the working drawing
 - 6.3 CAD data and determining the order of task according to the CAD data

ANNEX A2-2: Checklist to be Used in the Assessment and Evaluation of the Qualification Unit

a) INFORMATION

No.	Knowledge Statement	NOS-Related Department	Qualification Unit Performance Criteria:	Assessment Tools
INFO.1	Explains the work order or working drawing.	C.1.1	1.1	T1
INFO.2	Explains the preparation processes for the CNC machine and other units ready for operation.	D.1.1 D.1.2	1.3	T1
INFO.3	Explains the tools, apparatus and equipment to be used.	B.3.1 B.3.2 C.1.2 C.3.1 D.4.1 D.4.2	1.2 1.3	T1
INFO.4	Explains how to use the measurement and control tools.	D.3.4 D.4.4	1.1	T1
INFO.5	Explains tool chuck and clamping methods.	C.3.1 C.3.2	1.2	T1
INFO.6	Explains the characteristics of the cutting tools.	C.2.1 C.2.2 C.2.5	1.2	T1
INFO.7	Explains the methods of clamping the workpiece to the machine.	D.2.3 D.4.2 D.4.3	1.3	T1

No.	Knowledge Statement	NOS-Related Department	Qualification Unit Performance Criteria:	Assessment Tools
INFO.8	Explains the computer-assisted design-manufacturing (CAD-CAM) data of the work to be performed.	G.3.1 G.3.3	2.1 2.2	T1
INFO.9	How to create a solid model according to the working drawing.	H.1.4 H.5.2 H.5.3	2.1	T1
INFO.10	How to create tool paths according to the working drawing.	G.3.1 G.3.3	2.2	T1
INFO.11	Explains the CNC coding method.	E.1.1 E.1.2	3.1.	T1
INFO.12	Explains programming suitable for three-dimensional coordinate systems (x, y, z, a, b, c).	D.6.4 E.1.2 G.2.3	3.3.	T1
INFO.13	Explains the user coordinate system (piece setting) and the measurement system (metric/inch) of the operation.	E.3.1 E.3.2	3.2.	T1
INFO.14	Explains the geometric and physical properties of the tool selected.	C.2.2 C.2.5	3.2.	T1
INFO.15	Explains how to calculate the speed and processing rate according to the cutter and other variables.	E.4.3	3.2.	T1
INFO.16	Explains the chip inlet and exit methods of the cutting tool.	G.6.6 G.6.7	3.2.	T1
INFO.17	Explains the points of safe approach, secession and tool changing.	E.2.2 E.2.3 G.5.1	3.2.	T1
INFO.18	Explains the end of program tasks.	E.8.1 E.8.2	3.2.	T1
INFO.19	Explains how to simulate in a virtual environment or how to run the machine on idle mode.	E.8.1 E.8.2	3.3. 3.4.	T1
INFO.20	Explains how to start the program to run a single block (line by line).	F.1.7	4.1.	T1
INFO.21	Explains how to make manual, visual and dimensional checks of the machined piece.	A.3.1	4.2.	T1
INFO.22	Explains the necessary programming methods for serial production.	G.4.2	4.2.	T1

b) SKILLS AND COMPETENCIES

No.	Statement of Skills and Competencies	NOS-Related Department	Qualification Unit Performance Criteria:	Assessment Tools
*SC.1	Checks the order of work and tasks according to the manufacturing method by examining the work order, working drawing and/or CAD data of the work to be performed.	B.1.2 C.1.1 H.6.2	1.1	P1
SC.2	Checks the proper calibration of measurement and control tools.	B.2.2	1.2	P1

No.	Statement of Skills and Competencies	NOS-Related Department	Qualification Unit Performance Criteria:	Assessment Tools
SC.3	Prepares the raw material and clamping apparatus to be used according to the work and the working drawing.	B.3.1 D.4.2	1.3	P1
*SC.4	Prepares the cutter and tool chucks to be used according to the work and the working drawing.	D3.4 D3.5	1.3	P1
*SC.5	Turns on the CNC machine (turning on the switch and other units, checking the coolant liquid, air-oil pressures, etc.).	D.1.1 D.1.2	1.4	P1
*SC.6	Attaches the prepared holders to the machine and makes adjustments as necessary.	C.3.1 C.3.2	1.4	P1
*SC.7	Clamps the workpiece to the machine by using suitable tools.	D.4.1 D.4.2 D.4.3 D.4.4	1.4	P1
*SC.8	Offsets the workpiece.	D.2.1 D.7.5 G.4.1	1.4	P1
SC.9	Creates a solid model according to the working drawing.	H.1.1 H.1.4	2.1	P1
SC.10	Creates tool paths in accordance with the working drawing.	H.1.1 H.1.4	2.2	P1
*SC.11	Determines the method of CNC coding (Macro, Dialogue, CAM, etc.) and opens the programming page.	E.5.1 E.5.2	3.1. 3.2.	P1
*SC.12	Programs suitable for three-dimensional coordinate systems (x, y, z, a, b, c).	D.6.4 E.1.2 G.2.3	3.3.	P1
SC.13	Enters the user coordinate system and the measurement system (metric/inches) to the program.	E.3.1 E.3.2	3.2.	P1
*SC.14	Enters the raw material (stock) dimensions to be machined.	G.3.3	3.2.	P1
*SC.15	Enters the geometric and structural characteristics of the selected tool to the program.	C.4.1 C.4.2	3.2.	P1
SC.16	Calls up suitable tools and offsets on the program according to the operation order.	F.1.7 F.1.9	3.2.	P1
SC.17	Enters the speed, process rate and depth of cut values suitable for the cutter into the program.	E.4.3 E.5.3	3.2.	P1
*SC.18	Determines the tool movements in a way that eliminates the risk of the tool impacting the workpiece.	D.3.2	3.2.	P1
*SC.19	Creates tool paths in accordance with the working drawing.	G.6.13	3.2.	P1
SC.20	Uses the machine features depending on the operation.	F.1.4 F.2.2	3.2.	P1
SC.21	Performs the end-of-program tasks.	E.2.10	3.2.	P1

No.	Statement of Skills and Competencies	NOS-Related Department	Qualification Unit Performance Criteria:	Assessment Tools
*SC.22	Simulates the program created and runs the machine on idle.	G.8.1 G.8.2 G.8.3	3.3. 3.4.	P1
SC.23	Calls the program on the machine to run in a mode that will ensure faultless operation.	F.1.3 F.1.7	4.1.	P1
SC.24	Prepares the piece ready for serial production.	G.4.3	4.2.	P1
SC.25	Turns off the machine.	E.6.6	4.3.	P1
*SC.26	Apply the OHS rules in the works they carry out.	A.1.1	5.1.	P1
*SC.27	Applies the environmental protection measures in the works carried out.	A.2.1	5.2.	P1
*SC.28	Applies the quality requirements in the works carried out.	A.3.1	5.3	P1

(*) Critical steps that must be accomplished in the practical exam.

QUALIFICATION ANNEXES

ANNEX 1: Qualification Units

12UY0082-4/A1: Occupational Health and Safety, Environmental Safety and Quality

12UY0082-5/A2 Programming and Production in CNC Machines

ANNEX2: Terms, Symbols and Abbreviations

CLAMPING MOLD (FIXTURE): The apparatus for clamping the workpiece,

CNC: Computerized Numerical Control.

CAD: Computer Assisted Drawing

CAM: Computer Assisted Manufacturing

G AND M CODE: Movements and function code of the CNC program to be performed on the machine,

SAFE WORKING DISTANCE: The safety distance determined around the workpiece,

MOTION CODES: CNC Program codes that provide machine movements,

ISCO: International Standard Classification of Occupations,

OHS: Occupational Health and Safety.

CALIBRATION: The task of comparing a reliable and accurate (traceable) reference measuring device with an unreliable and inaccurate measuring device and reporting the results of measurement.

CUTTING LIQUID: The liquid used in machining tasks to reduce possible high temperatures created by friction between the workpiece and cutting tools to reasonable values,

PERSONAL PROTECTIVE EQUIPMENT(PPE): All tools, equipment, instruments, and devices that are either worn, put on, or held to protect the workers against one or multiple risks which may arise during work or which may affect their health and safety.

COMMAND: The smallest traceable element that consists of any of the basic tasks a computer can perform.

CONTROL PANEL: The section containing the keys such as program writing, manually moving the cutter in the axes, program starting, stopping, manually selecting the tool, and the program writing screen,

MENU: List of commands or options,

OFFSET PAGE: The section where the cutting tool information and the workpiece are defined on the control panel of CNC machines,

OPERATION: The machining tasks applied to shape the part,

MACRO AND DIALOGUE PROGRAMMING: Over-the-counter programs that are prepared for a specific purpose and that can be used without computer expertise,

PROGRAM CODES: Codes used to program the CNC machines,

REFERENCE: A constant point,

RISK: Composition of the probability of occurrence of a dangerous incident and its consequences.

PIECE RESET (PIECE OFFSET): To determine a point of the workpiece as a reference,

SIMULATION: Recreating a real situation with the help of a computer program (in a virtual environment) by taking all its variables into account,

STOCK: Material to be machined on the machine,

TOOL CODES (NAMES): Codes used in tool related tasks in CNC machines

TOOL RESET (TOOL OFFSET): Transferring the tool dimensions to the offset page according to the determined reference point,

TOOL PATH: The paths followed by the tool on the piece in the process of machining,

CUTTING DEPTH: The thickness of the material removed from the workpiece,

HAZARD: The potential for harm or damage that exists in the workplace or may come from outside, which may affect the employee or the workplace.

TOLERANCE: The difference between the largest and the smallest acceptable dimensions,

HOLDER: Elements that are used to attach cutters to the workbench, such as milling cutters, drills, and taps.

THREE-DIMENSIONAL (X, Y, Z, A, B, C) COORDINATE SYSTEM: Tool path in three axes (x, y, z) and above (auxiliary axes-A, B, C),

ANNEX 3: Pathways to Horizontal and Vertical Advancement in the Occupation

ANNEX 4: Evaluator Criteria

The evaluator must meet at least one of the following criteria.

- Having graduated from the Machinery and Metalworks Education departments of Technical Education Faculties and having at least three (3) years of occupational experience in the field of CNC programming,
- Having graduated from any of the Mechanical, Mechatronic, Production and Manufacturing Engineering departments of Engineering and Technology Faculties, and having at least three (3) years of occupational experience in the field of CNC programming,
- Having graduated from machinery associate degree programs and having at least five (5) years of occupational experience in CNC programming,

Evaluators who possess the above-mentioned characteristics and who will participate in the assessment and evaluation process should be trained in vocational qualification system, relevant national qualification(s), relevant national occupational standard(s), assessment and evaluation and quality assurance and OHS in assessment and evaluation by institutions authorized in the relevant field.