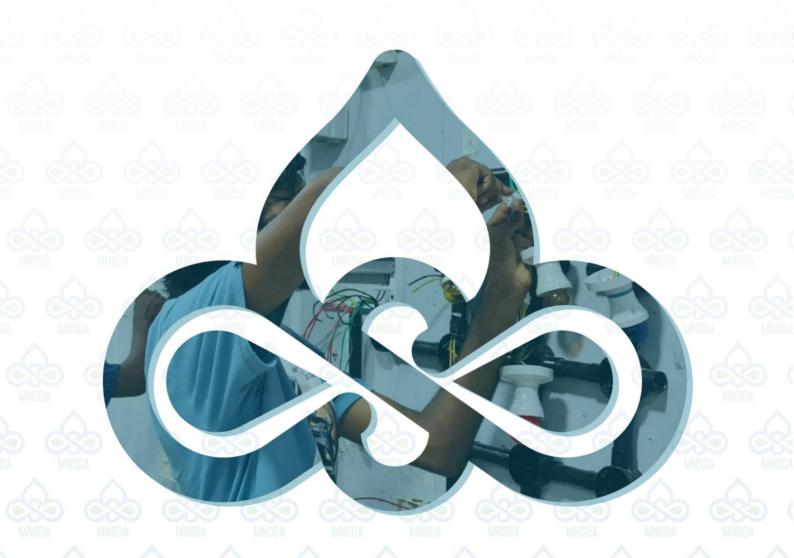**Maldives National Skills Development Authority**

National Competency Standard for Programming

Standard Code: ICT-01L3-V2-24

FOREWORD

The pivotal role of the Maldives National Skills Development Authority (MNSDA) in meticulously implementing and expanding Technical and Vocational Education & Training (TVET) exemplifies the steadfast commitment of the Maldives to build a skilled and resilient workforce. This commitment is evident from the strategic formulation of National Standards and the establishment of a comprehensive framework for training and certification.

Under the Higher Education and Training Act 7/2021, the MNSDA assumes an instrumental role, reflecting the government's unwavering dedication to streamlining TVET policies and procedures. This includes the establishment of a robust system for accrediting and registering both Institution Based Training (IBT) and Employer Based Training (EBT) providers. The MNSDA's active involvement in conducting the National Apprenticeship Program (NAP), National Trade Testing and Certification (NTTC), and the issuance of National Certificates reflects a comprehensive approach to ensure elevated quality standards and competency within the workforce.

The National Competency Standards (NCS) revised through the Maldives Enhancing Employability and Resilience of Youth (MEERY) project accentuates the commitment to updating and sustaining contemporary skill sets aligned precisely with industry demands. Deliberate efforts to revise existing NCS, coupled with the development of curriculum, teaching materials, resource books, and logbooks, attest to our dedication to ensuring the ongoing relevance and currency of the TVET system in the Maldives.

The active engagement of Technical Panels and Employment Sector Councils in the NCS development and approval process, coupled with alignment to the Maldives National Qualification Framework (MNQF) and accreditation by the Maldives Qualifications Authority (MQA), certifies that the TVET system not only remains highly responsive but also ensures the quality standards demanded by industries. This approach enables the system to effectively meet the diverse needs of industries and adapt to the evolving economic landscape.

The collaborative development of the National Certificate III in Programming by the MNSDA, MEERY, and the Maldives Institute of Technology exemplifies the practical implementation of TVET initiatives. This training package represents a critical stride towards addressing the requisite skills while fostering opportunities to integrate sustainable economic development within the TVET framework.

Dr. Zahra Mohamed

Chief Executive Officer

Maldives National Skills Development Authority

EMPLOYMENT SECTOR COUNCILS

#	Name	Designation	Organization
01	Adam Iyaz	Director	Ministry of Homeland Security and Technology
02	Hussain Mohamed	IT Manager, IT Infrastructure	National Centre for Information Technology
03	Mariyam Asna Saeed	President	Women in Tech
04	Hassan Ali	Deputy General Manager, ICT	Maldives Water and Sewerage Company
05	Dr. Ali Fawaz Shareef	Deputy Vice Chancellor	Maldives National University
06	Naail Abdul Rahman	ICT Expert	-
07	Dr. Mohamed Kinaanath	ICT Expert	-
08	Dr. Ibrahim Shiyam	ICT Consultant	-
09	Shakeeba Ali	Director General	Maldives National Skills Development Authority

National Occupational Standard has been endorsed by:

Dr. Mohamed Kinaanath

 Chairperson

ICT Sector Council

Maldives National Skills Development Authority

Umar Zahir Office Building, 5th Floor,

Orchidmaa Hingun, Hulhumale', Republic of Maldives.

Date of Endorsement: 25.06.2024

TECHNICAL SUPPORT

#	Name	Designation	Organization
01			
02			

TECHNICAL PANEL MEMBERS			
#	Name	Designation	Organisation
01	Abdulla Yameen	UI/UX Software developer	Housing Development Corporation
02	Mohamed Ishan	-	Freelance Lecturer
03	Fathimath Sabena	Digitalization Officer	Maldives State Shipping

VERSION	DEVELOPER	DATE	STANDARD CODE
V2	Maldives Institute of Technology	24-03-2024	ICT-01L3-V2-24

Standard Review Process

To begin with, programming occupation competencies were profiled through study of the occupations across the Maldivian workplaces aligned to the principles of "Functional Analysis", a methodology used for reviewing Competency Standards. Referred occupational profiling process compared existing competency units incorporated within the National Competency Standard of Level III in Programming program.

Draft Review of the occupational standard is then compiled and submitted to the Technical Panel (TP) organised by the Maldives National Skills Development Authority (MNSDA). The Draft Standard is then edited based on comments from TP members under the direct observation of MNSDA. With series of reviewing and editings, TP approved standard is then tabled at Employment Sector Council (ESC) meeting for endorsement.

All the Standards of MNSDA are endorsed from the ESC before being published on its website.

Description of "Programming"

The National Certificate III in Programming is a comprehensive program designed to equip individuals with foundational skills and knowledge in computer programming. Participants will explore various programming languages, concepts, and techniques essential for software development.

This course offers an entry point for individuals interested in the evolving field of programming, empowering them to embark on a rewarding career path in the tech industry.

Recommended changes to the existing National Certificate III in Programming

The changes proposed by the internal expert team from MIT for the National Certificate-3 in Programming Standard aim to synchronise the curriculum with contemporary industry benchmarks. These revisions are intended to ensure that the program aligns seamlessly with current standards and practices prevalent within the industry.

Job opportunities upon completion of "National Certificate III in Programming"

Upon successful completion of the National certificate III in Programming, students can work in the following jobs.
   1. *Entry level Developer*

KEY FOR CODING

Coding Competency Standards and Related Materials

DESCRIPTION	REPRESENTED BY
Industry Sector as per ESC (Three letters)	Construction Sector (CON) Fisheries and Bar Bending (FNA) Information, Communication and Technology (ICT) Transport Sector (TRN) Tourism Sector (TOU) Social Sector (SOC) Foundation (FOU)
Standard Number - Occupation with in an industry sector	Two digits 01-99
Common Competency	CM
Core Competency	CC
Unit Number - Occupation with in a Standard	Three digits 01-99
MNQF level of qualification	L1, L2, L3, L4 etc.
Version Number	V1, V2 etc.
Separator	-
Year of Last Review of standard, qualification	Two digits responding to the year of last review, example 23 for the year 2023
Qualification Code	Refers to Standard code in cover page

1. Endorsement Application for Qualification 01		
2. NATIONAL CERTIFICATE III IN PROGRAMMING		

3. Qualification code: ICT-01L3-V2-24	**Total Number of Credits: 54**

4. Purpose of the qualification

The qualification aims equip learners with foundational programming skills, including understanding programming concepts, writing code, and debugging programs. Upon completion of this qualification, individuals will be prepared to enter the workforce as entry-level programmers or continue their education in more advanced programming topics.

5. Regulations for the qualification	National Certificate III in the occupation of Programming will be awarded to those who are competent in units 1+2+3+4+5+6+7+8+9+10+11+12+13+14

6. Schedule of Units

Unit No.	Unit Title	Code
Common Competencies		
01	Apply work ethics and optimise professionalism	ICT-01-CM01-V2-24
02	Practice effective workplace communication	ICT-01-CM02-V2-24
03	Provide effective customer care	ICT-01-CM03-V2-24
04	Perform computer operations	ICT-01-CM04-V2-24
Core Competencies		
05	Understand fundamental programming concepts	ICT-01-CC01-V2-24
06	Write code using programming languages	ICT-01-CC02-V2-24
07	Develop basic algorithms	ICT-01-CC03-V2-24
08	Debug and troubleshoot code	ICT-01-CC04-V2-24
09	Apply object-oriented programming principles	ICT-01-CC05-V2-24
10	Create simple software applications	ICT-01-CC06-V2-24
11	Design and implement user interfaces	ICT-01-CC07-V2-24
12	Manage data using databases	ICT-01-CC08-V2-24
13	Test and validate software applications	ICT-01-CC09-V2-24
14	Utilise version control systems	ICT-01-CC10-V2-24

7. Accreditation requirements	The training provider should have made arrangements to ensure students are provided with adequate theory and practicals for them to develop all the required knowledge and skills stipulated in the National Competency Standard.
8. Recommended sequencing of units	As appearing under the section 06

Unit Details

Unit No.	Unit Title	Code	Level	No. of credits	Credit hours	Contact hours
01	Apply work ethics and optimise professionalism	ICT-01-CM01-V2-24	III	03	30	15
02	Practice effective workplace communication	ICT-01-CM02-V2-24	III	03	30	15
03	Provide effective customer care	ICT-01-CM03-V2-24	III	05	50	25
04	Perform computer operations	ICT-01-CM04-V2-24	III	03	30	15
05	Understand fundamental programming concepts	ICT-01-CC01-V2-24	III	03	30	15
06	Write code using programming languages	ICT-01-CC02-V2-24	III	04	40	20
07	Develop basic algorithms	ICT-01-CC03-V2-24	III	04	40	20
08	Debug and troubleshoot code	ICT-01-CC04-V2-24	III	05	50	25
09	Apply object-oriented programming principles	ICT-01-CC05-V2-24	III	04	40	20
10	Create simple software applications	ICT-01-CC06-V2-24	III	05	50	25
11	Design and implement user interfaces	ICT-01-CC07-V2-24	III	04	40	20
12	Manage data using databases	ICT-01-CC08-V2-24	III	04	40	20
13	Test and validate software applications	ICT-01-CC09-V2-24	III	03	30	15
14	Utilise version control systems	ICT-01-CC10-V2-24	III	04	40	20
Total				54	540	270

Packaging of National Qualifications:

National certificate III in Programming will be awarded to those who are competent in units 1+2+3+4+5+6+7+8+9+10+11+12+13+14

Qualification Code: ICT-01L3-V2-24

COMPETENCY BASED ASSESSMENT

The final assessment of the National Competency-Based Programmes conducted by the Maldives National Skills Development Authority (MNSDA) is a competency-based assessment.

The Competency-Based Assessment ensures that the students' performance meets the requirements specified in the National Competency Standards (NCS). This assessment approach is designed to verify that graduates are job-ready and meet established occupational competency requirements within their respective fields.

Eligibility for Final Assessment

To be eligible for the final Competency-Based Assessment, students must fulfil the following conditions:

- achieve a **minimum of 80%** attendance
- deemed competent in each of the units of the programme in the pre-assessment

Competency-Based Assessment Process

Upon submission of the Pre-assessment report by the training provider, MNSDA will check for all the necessary supporting documents and conduct Competency-Based Assessment through a National Assessor registered with MNSDA. It is important to note that any trainer involved in the training process is **not permitted** to conduct the assessment to maintain impartiality and integrity of the process.

The final Competency-Based Assessment conducted by MNSDA includes both:

- **Theory**: Evaluating students' knowledge and understanding of key theoretical aspects of the competency.
- **Practical:** Assessing hands-on skills and application of knowledge in real-world or simulated environments.

Once the assessment is completed, the National Assessor will send the Competency-Based Assessment Report to MNSDA.

Competency Status Requirement

For certification to be granted, the student must be officially declared **"Competent"** in each of the units of the programme by the National Assessor.

Conclusion

Competency-Based Assessment is a critical component in ensuring the quality and credibility of technical and vocational skills-based training. By adhering to the outlined procedure, MNSDA upholds the standards required to certify students who are fully prepared to meet industry demands.