COMPETENCY STANDARD

Web Application Development with ASP.Net

Level: 04

(ICT Sector)

Competency Standard Code: CS-ICT-WDDN-L4-EN-V1

National Skills Development Authority
Prime Minister's Office
Government of the People's Republic of Bangladesh

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This Competency Standard for Web Application Development with ASP.Net is a document for the development of curricula, teaching and learning materials, and assessment tools. It also serves as the document for providing training consistent with the requirements of industry in order to meet the qualification of individuals who graduated through the established standard via competency-based assessment for a relevant job.

This document has been validated by NSDA in association with Information Communication Technology Sector ISC, industry representatives, academia, related specialist, trainer and related employee.

Public and private institutions may use the information contained in this standard for activities benefitting Bangladesh.

Introduction

The NSDA aims to enhance an individual's employability by certifying completeness with skills. NSDA works to expand the skilling capacity of identified public and private training providers qualitatively and quantitatively. It also aims to establish and operationalize a responsive skills ecosystem and delivery mechanism through a combination of well-defined set of mechanisms and necessary technical supports.

Key priority economic growth sectors identified by the government have been targeted by NSDA to improve current job skills along with existing workforce to ensure required skills to industry standards. Training providers are encouraged and supported to work with industry to address identified skills and knowledge to enable industry growth and increased employment through the provision of market responsive inclusive skills training program. "Web Application Development with ASP.Net" is selected as one of the priority occupations of Information Communication Technology Sector. This standard is developed to adopt a demand driven approach to training with effective inputs from Industry Skills Councils (ISC's), employer associations and employers.

Generally, a competency standard informs curriculum, learning materials, assessment and certification of trainees enrolled in Skills Training. Trainees who successfully pass the assessment will receive a qualification in the National Skills Qualification Framework (NSQF) under Bangladesh National Qualification Framework (BNQF) and will be listed on the NSDA's online portal.

This competency standard is developed to improve skills and knowledge in accordance with the job roles, duties and tasks of the occupation and ensure that the required skills and knowledge are aligned to industry requirements. A series of stakeholder consultations, workshops were held to develop this document.

The document also details the format, sequencing, wording and layout of the Competency Standard for an occupation which is comprised of Units of Competence and its corresponding Elements.

Overview

A competency standard is a written specification of the knowledge, skills and attitudes required for the performance of an occupation, trade or job corresponding to the industry standard of performance required in the workplace.

The purpose of a competency standards is to:

- provide a consistent and reliable set of components for training, recognising and assessing people's skills, and may also have optional support materials
- enable industry recognised qualifications to be awarded through direct assessment of workplace competencies
- encourage the development and delivery of flexible training which suits individual and industry requirements
- encourage learning and assessment in a work-related environment which leads to verifiable workplace outcomes

Competency standards are developed by a working group comprised of representative from NSDA, Key Institutions, ISC, and industry experts to identify the competencies required of an occupation in Informal Sector.

Competency standards describe the skills, knowledge and attitude needed to perform effectively in the workplace. CS acknowledge that people can achieve technical and vocational competency in many ways by emphasizing what the learner can do, not how or where they learned to do it.

With competency standards, training and assessment may be conducted at the workplace or at training institute or any combination of these.

Competency standards consist of a number of units of competency. A unit of competency describes a distinct work activity that would normally be undertaken by one person in accordance with industry standards.

Units of competency are documented in a standard format that comprises of:

- unit title
- nominal duration
- unit code
- unit descriptor
- elements and performance criteria
- variables and range statement
- curricular content guide
- assessment evidence guides

Together, all the parts of a unit of competency:

- describe a work activity
- guide the assessor to determine whether the candidate is competent or not yet competent

The ensuing sections of this document comprise of a description of the relevant occupation, trade or job with all the key components of a unit of competency, including:

- a chart with an overview of all Units of Competency for the relevant occupation, trade or job including the Unit Codes and the Unit of Competency titles and corresponding Elements
- the Competency Standard that includes the Unit of Competency, Unit Descriptor, Elements and Performance Criteria, Range of Variables, Curricular Content Guide and Assessment Evidence Guide.

Competency Standards for National Skills Certificate – Level-4 in Web Application Development with ASP.Net in ICT Sector

Level Descriptors of NSQF (BNQF 1-6)

Level & Job Classification	**Knowledge Domain**	Skills Domain	**Responsibility Domain**
6-Mid-Level Manager/ Sub Assistant Engineer	Comprehensive actual and theoretical knowledge within a specific work or study area with an awareness of the validity and limits of that knowledge, able to analyse, compare, relate and evaluate.	Specialised and wider range of cognitive and practical skills required to provide leadership in the development of creative solutions to defined problems. Communicate professional issues and solutions to the team and to external partners/users.	Work under broad guidance and self-motivation to execute strategic and operational plan/s. Lead lower-level management. Diagnose and resolve problems within and among work groups.
5-Supervisor	Broad knowledge of the underlying, concepts, principles, and processes in a specific work or study area, able to scrutinize and break information into parts by identifying motives or causes.	Broad range of cognitive and practical skills required to generate solutions to specific problems in one or more work or study areas. Communicate practice-related problems and possible solutions to external partners.	Work under guidance of management and self-direction to resolve specific issues. Lead and take responsibility for the work and actions of group/team members. Bridge between management.
4-Highly Skilled Worker	Broader knowledge of the underlying, concepts, principles, and processes in a specific work or study area, able to solve problems to new situations by comparing and applying acquired knowledge.	A range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying the full range of methods, tools, materials and information. Communicate using technical terminology and IT technology with partners and users as per workplace requirements.	Work under minimal supervision in specific contexts in response to workplace requirements. Resolve technical issues in response to workplace requirements and lead/guide a team/ group.
3-Skilled Worker	Moderately broad knowledge in a specific work or study area, able to perceive ideas and abstract from drawing and design according to workplace requirements.	Basic cognitive and practical skills required to use relevant information in order to carry out tasks and to solve routine problems using simple rules and tools. Communicate with his team and limited external partners upholding the values, nature and culture of the workplace	Work or study under supervision with considerable autonomy. Participate in teams and responsible for group coordination.
2-Semi Skilled Worker	Basic understanding of underpinning knowledge in a specific work or study area, able to interpret and apply common occupational terms and instructions.	Skills required to carry out simple tasks, communicate with his team in the workplace presenting and discussing results of his work with required clarity.	Work or study under supervision in a structured context with limited scope of manipulation
1 –Basic Skilled Worker	Elementary understanding of ability to interpret the underpinning knowledge in a specific study area, able to interpret common occupational terms and instructions.	Specific Basic skills required to carry out simple tasks. Interpret occupational terms and present the results of own work within guided work environment/ under supervision.	Work under direct supervision in a structured context with limited range of responsibilities.

List of Abbreviations

General	
NSDA	National Skills Development Authority
BMET	Bureau of Manpower Employment and Training
ILO	International Labor Organization
ISC	Industry Skills Council
NPVC	National Pre-Vocation Certificate
NSQF	National Skills Qualifications Framework
PPP	Public Private Partnership
SCVC	Standards and Curriculum Validation Committee
SEIP	Skills for Employment Investment Program
STP	Skills Training Provider
UoC	Unit of Competency
OSH	Occupational Health and Safety
SOP	Standard Operating Procedures
PPE	Personal Protective Equipment
OOP	Object Oriented Programming
HTML	Hypertext Mark-up Language
CSS	Cascading Style Sheets
MVC	Model–view–controller
DBMS	Database Management Systems
SDLC	Software development life cycle
SQL	Structured Query Language

Approval of Competency Standard

Approved By
21st Authority Meeting of NSDA Held on 19.09.2022

Md. Sanlul Ferdous
Deputy Director (Admin)
National Skills Development Authority
Prime Min -

Deputy Director (Admin)
and
Officer of Secretarial Duties for Authority Meeting
National Skills Development Authority

Contents

Competency Standards for National Skill Certificate – 4 in Web Application Development with ASP.Net in ICT Sector

Course Structure

SL	Unit Code and Title		UoC Level	Nominal Duration (Hours)
Generic Units of Competencies				**50**
1.	GU-02-L2-V1	Apply Occupational Health and Safety (OHS) Practice in the Workplace	2	15
2.	GU-08-L2-V1	Work in a Team Environment	2	20
3.	GU-11-L3-V1	Make a Presentation	3	15
Sector Specific Units of Competencies				**15**
4.	SU-ICT-05-L3-V1	Comply with ethical standards in the ICT workplace	3	15
Occupation Specific Units of Competencies				**295**
5.	OU-ICT-WDDN-01-L3-V1	Apply Basic C-Sharp (C#)	4	30
6.	OU-ICT-WDDN-02-L3-V1	Work with Object Oriented Programming (OOP) Basics	4	45
7.	OU-ICT-WDDN-03-L3-V1	Use C# essential features	4	30
8.	OU-ICT-WDDN-04-L3-V1	Work with Web Design	4	50
9.	OU-ICT-WDDN-05-L3-V1	Work with Relational Database Management	4	45
10.	OU-ICT-WDDN-06-L4-V1	Apply Web Programming Basics using Asp. Net MVC	4	45
11.	OU-ICT-WDDN-07-L4-V1	Perform Project Work with ASP.Net	4	50
Total Nominal Learning Hours				**360**

Units & Elements at Glance

Generic Units of Competencies

SL	Code	Unit of competency	Elements of Competency	Duration (hours)
1.	GU-02-L2-V1	Apply Occupational Safety and Health (OSH) Procedure in the Workplace	1. Identify OSH policies and procedures 2. Follow OSH procedure 3. Report hazards and risks 4. Respond to emergencies 5. Maintain personal well-being	15
2.	GU-08-L2-V1	Work in a Team Environment	1. Define team role and scope 2. Identify individual role and responsibility 3. Participate in team discussions 4. Work as a team member	20
3.	GU-11-L3-V1:	Make a Presentation	1. Prepare written presentation 2. Identify interview techniques 3. Prepare official presentation	15
Total hours				**50**

Sector Specific Units of Competencies

SL	Code	Unit of competency	Elements of Competency	Duration (hours)
1	SU-ICT-05-L3-V1	Comply to Ethical Standards in the ICT Workplace	1. Uphold the requirements of clients 2. Deliver quality products and services 3. Maintain professionalism at workplace 4. Maintain workplace code of conduct.	15
Total hours				**15**

Occupation-Specific Units of Competencies

SL	Code	Unit of competency	Elements of Competency	Duration (hours)
01	OU-ICT-WDDN-01-L4-v1	Apply Basic C-Sharp (C#)	1. Work with variables 2. Apply C# basic data type 3. Control program flow 4. Work with various loops 5. Work with array 6. Work with collection 7. Implement data structure and algorithm	30
02	OU-ICT-WDDN-02-L4-v1	Work with Object Oriented Programming (OOP) Basics	1. Work with class and objects 2. Create association 3. Create inheritance 4. Work with abstract class, method and interface	45
03	OU-ICT-WDDN-03-L4-v1	Use C# essential features	1. Apply error handling 2. Apply event delegate and lambda expression 3. Implement LINQ	30
04	OU-ICT-WDDN-04-L4-v1	Work with Web Design	1. Define the working principle of the web 2. Use HTML (Hypertext Mark-up Language) 3. Implement Cascading Style Sheets (CSS) in a website 4. Use JavaScript in a website	50
05	OU-ICT-WDDN-05-L4-v1	Work with Relational Database Management	1. Interpret Databases basics 2. Differentiate different Database Management Systems (DBMS) 3. Create Database of a Website in a Database Management System. 4. Implement views, stored procedure and functions	45
06	OU-ICT-WDDN-06-L4-v1	Apply Web Programming Basics using Asp. Net MVC	1. Apply the basic terminologies of MVC (model–view–controller) 2. Utilize ASP.Net MVC 3. Use entity framework (EF) 4. Work with Model and View 5. Work with .Net core fundamentals 6. Work with REST API 7. Work with authentication and authorization 8. Deploy web application	45
07	OU-ICT-WDDN-07-L4-v1	Perform Project Work with ASP.Net	1. Interpret project management basics 2. Develop an application in ASP.Net 3. Develop user story 4. Perform unit testing 5. Create project presentation 6. Develop awareness about rights	50
	Total Hours			**295.**

Generic Units of Competencies

Unit Code and Title	**GU-02-L2-V1: Apply Occupational Safety and Health (OSH) Procedure in the Workplace**
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to apply occupational safety and health (OSH) procedure in the workplace. It specifically includes the task of identifying OSH policies and procedures, following OSH procedure, reporting hazards and risks, responding to emergencies and maintaining personal well-being.
Nominal Hours	**15 Hours**
Elements of Competency	**Performance Criteria** **Bold & Underlined** terms are elaborated in the Range of Variables
1. Identify OSH policies and procedures	1.1. **OSH policies** and **safe operating procedures** are accessed and stated 1.2. **Safety signs and symbols** are identified and followed 1.3. Emergency response, evacuation procedures and other contingency measures are determined according to workplace requirements
2. Follow OSH procedure	2.1 **Personal protective equipment (PPE)** is selected and collected as required 2.2 Personal protective equipment (PPE) is correctly used in accordance with organization OSH procedures and practices 2.3 A clear and tidy workplace is maintained as per workplace standard 2.4 PPE is maintained to keep them operational and compliant with OSH regulations
3. Report hazards and risks	3.1 **Hazards** and risks are identified, assessed and controlled 3.2 Incidents arising from hazards and risks are reported to designated authority
4. Respond to emergencies	4.1 Alarms and warning devices are responded 4.2 Workplace **emergency procedures** are followed 4.3 **Contingency measures** during workplace accidents, fire and other emergencies are recognized and followed in accordance with organization procedures 4.4 First aid procedures are applied during emergency situations
5. Maintain personal well-being	5.1 OSH policies and procedures are adhered to OSH awareness programs are participated in as per workplace guidelines and procedures.

	5.2 Corrective actions are implemented to correct unsafe condition in the workplace 5.3 **"Fit to work" records** are updated and maintained according to workplace requirements
Range of Variables	
Variables	**Range** (may include but not limited to):
1. OSH policies	1.1. Bangladesh standards for OSH 1.2. Fire Safety Rules and Regulations 1.3. Code of Practice 1.4. Industry Guidelines
2. Safe operating procedures	2.1 Orientation on emergency exits, fire extinguishers, fire escape, etc. 2.2 Emergency procedures 2.3 First Aid procedures 2.4 Tagging procedures 2.5 Use of PPE 2.6 Safety procedures for hazardous substances
3. Safety signs and symbols	3.1 Direction signs (exit, emergency exit, etc.) 3.2 First aid signs 3.3 Danger Tags 3.4 Hazard signs 3.5 Safety tags 3.6 Warning signs
4. Personal Protective Equipment (PPE)	4.1 Gas Mask 4.2 Gloves 4.3 Safety boots 4.4 Face mask 4.5 Overalls 4.6 Goggles and safety glasses 4.7 Sun block 4.8 Chemical/Gas detectors
5. Hazards	5.1 Chemical hazards 5.2 Biological hazards 5.3 Physical Hazards 5.4 Mechanical and Electrical Hazard 5.5 Mental hazard 5.6 Ergonomic hazard
6. Emergency procedures	6.1 Fire fighting 6.2 Earthquake 6.3 Medical and first aid

	6.4 Evacuation
7. Contingency measures	7.1 Evacuation 7.2 Isolation 7.1 Decontamination
8. "Fit to Work" records	8.1 Medical Certificate every year 8.2 Accident reports, if any 8.3 Eye vision certificate
Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent, recent and meet all requirements of current version of the Unit of Competency	
1. Critical aspects of competency	Assessment required evidence that the candidate: 1.1 stated OSH policies and safe operating procedures 1.2 followed safety signs and symbols 1.3 used personal protective equipment (PPE) 1.4 maintained workplace clear and tidy 1.5 assessed and Controlled hazards 1.6 followed emergency procedures 1.7 followed contingency measures 1.8 implemented corrective actions
2. Underpinning knowledge	2.1 Define OSH 2.2 OSH Workplace Policies and Procedures 2.3 Work safety procedures 2.4 Emergency procedures 2.5 Hazard control procedure 2.6 Different types of hazards 2.7 PPE and there uses 2.8 Personal hygiene practices 2.9 OSH awareness
3. Underpinning skills	3.1 Accessing OSH policies 3.2 Using of PPE 3.3 Handling cleaning tools and equipment 3.4 Writing report 3.5 Responding to emergency procedures
4. Required attitude	4.1 Commitment to occupational health and safety 4.2 Sincere and honest to duties 4.3 Promptness in carrying out activities 4.4 Environmental concerns 4.5 Eagerness to learn 4.6 Tidiness and timeliness 4.7 Respect of peers and seniors in workplace 4.8 Communicate with peers and seniors in workplace

5. Resource implications	5.1 Workplace 5.2 Equipment and outfits appropriate in applying safety measures 5.3 Tools, equipment, materials and documentation required 5.4 OSH Policies and Procedures
6. Methods of assessment	Competency should be assessed by: 6.1 Written test 6.2 Demonstration 6.3 Oral questioning
7. Context of assessment	7.1 Competency assessment must be done in NSDA accredited assessment centre 7.2 Assessment should be done by a NSDA certified/nominated assessor

Accreditation Requirements

Training Providers must be accredited by National Skills Development Authority (NSDA), the National Quality Assurance Body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of qualification under NSQF. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.

Unit Code and Title	**GU-08-L2-V1: Work in a Team Environment**
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to work in a team environment. It specifically includes the task of defining team role and scope, identifying individual role and responsibility, participating in team discussions and working as a team member.
Nominal Hours	**20 Hours**
Elements of Competency	**Performance Criteria** **Bold & Underlined** terms are elaborated in the Range of Variables
1. Define team role and scope	1.1. Role and objectives of the team are defined 1.2. Team structure, responsibilities and reporting relations are identified from team discussions and other external sources
2. Identify individual role and responsibility	2.1 Individual roles and responsibilities of **team members** are identified 2.2 Reporting relationships among team members are defined and clarified 2.3 Reporting relationships external to the team are defined and clarified
3. Participate in team discussions	3.1 Ideas related to team plans are contributed 3.2 Recommendations for improving team work are put forward
4. Work as a team member	4.1 Effective forms of communication are used to interact with team members 4.2 Communication channels are followed 4.3 OHS practices are followed
Range of Variables	
Variables	**Range** (may include but not limited to):
1. Team Members	1.1 Coach/mentor 1.2 Supervisor/Manager 1.3 Peers/Colleagues 1.4 Employee representative
Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent, recent and meet all requirements of current version of the Unit of Competency	
1. Critical aspects of competency	Assessment required evidence that the candidate: 1.1 demonstrated knowledge in working in a team environment. 1.2 satisfied the requirements mentioned in the

	1.3 Performance Criteria and Range of Variables
2. Underpinning knowledge	2.1 Team structure, role and responsibility 2.2 Individual members' roles and responsibilities 2.3 Communication flow and reporting structures 2.4 Team planning 2.5 Interpersonal communication skills 2.6 Team meeting procedures 2.7 OHS practices
3. Underpinning skills	3.1 Identifying the role and responsibility of the team 3.2 Identifying roles and responsibilities of individual members 3.3 Participating in team discussions 3.4 Working as a team member
4. Required attitude	4.1 Commitment to occupational health and safety 4.2 Sincere and honest to duties 4.3 Promptness in carrying out activities 4.4 Environmental concerns 4.5 Eagerness to learn 4.6 Tidiness and timeliness 4.7 Respect of peers and seniors in workplace 4.8 Communicate with peers and seniors in workplace
5. Resource implications	5.1 Pens 5.2 Telephone 5.3 Computer 5.4 Writing materials 5.5 Online communication
6. Methods of assessment	Competency should be assessed by: 6.1 Written test 6.2 Demonstration 6.3 Oral questioning
7. Context of assessment	7.1 Competency assessment must be done in NSDA accredited assessment centre 7.2 Assessment should be done by a NSDA certified/nominated assessor

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Unit Code and Title	**GU-11-L3-V1: Make a Presentation**
Unit descriptor	This unit covers the skills, knowledge and attitudes required to make a presentation. It specifically includes preparing a written presentation, identifying interview techniques and preparing official presentation.
Nominal Hours	15 Hours
Elements of Competency	**Performance Criteria** **Bold & Underlined** terms are elaborated in the Range of Variables Training Components
1. Prepare written presentation	1.1 Personal written presentation matters and requirements are identified. 1.2 Standard resume writing techniques are identified and applied. 1.3 Standard coverletter points are clearly explained and utilised. 1.4 Portfolio is created on professional social media.
2. Identify interview techniques	2.1 **Types of interviews** are identified and explained. 2.2 Interview techniques are identified and described. 2.3 Steps to prepare for interview are identified and employed. 2.4 Interview phases are identified and recognised.
3. Prepare official presentation	3.1 **Presentation media** is identified. 3.2 Presentation plan is outlined. 3.3 Presentation is prepared.
Range of Variables	
Variables	**Range** (may include but not limited to)
1. Types of interviews	1.1 Written 1.2 Oral 1.2.1. One-on-one 1.2.2. Group 1.2.3. Telephone 1.2.4. 1.3 Online 1.4 Demonstration
2. Presentation media	2.1 Board 2.2 Poster paper 2.3 Slides 2.4 Photographs 2.5 Audio 2.6 Video 2.7 Website
Evidence guides The evidence must be authentic, valid, sufficient, reliable, consistent and recent and meet the requirements of the current version of the unit of competency.	
1. Critical aspects of	Assessment must evidence that the candidate: 1.1 created personal written presentation

competency	1.2 applied different techniques to interview 1.3 prepared official presentation
2. Underpinning knowledge	2.1 Curriculum Vitae/Resume 2.2 Coverletter 2.3 Presentation media
3. Underpinning skills	3.1 Create personal written presentation 3.2 Identify interview techniques 3.3 Prepare for different types of interviews 3.4 Develop official presentation
4. Underpinning attitudes	4.1 Active on teamwork 4.2 Prompt in carrying out activities 4.3 Tidy and punctual 4.4 Respectful of peers, subordinates and seniors in the workplace 4.5 Sincere and honest concerning duties
5. Resource implications	5.1 The following resources must be provided: 5.2 Workplace (simulated or actual) 5.3 IT tools 5.4 Computers with word processing application 5.5 Internet connection 5.6 Presentations 5.7 Learning manuals
6. Methods of assessment	Methods of assessment may include but not limited to: 6.1 Written test 6.2 Demonstration 6.3 Oral questioning
7. Context of assessment	7.1 Competency assessment must be done in NSDA accredited center. 7.2 Assessment should be done by NSDA certified/ nominated assessor.

Accreditation Requirements

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Sector Specific Units of Competencies

Unit Code and Title	**SU-ICT-05-L3-V1: Comply to Ethical Standards in the ICT Workplace**
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to comply to ethical standards in the ICT workplace. It specifically includes upholding the requirements of clients, delivering quality products and services, maintaining professionalism at workplace, and maintaining workplace code of conduct.
Nominal Hours	**15 Hours**
Elements of Competency	**Performance Criteria** **Bold and Underlined** terms are elaborated in the Range of Variables
1. Uphold the requirements of clients	1.1 Clients' requirements are identified. 1.2 Confidentiality of information is maintained in accordance with workplace policies / organizational policies/ national legislation. 1.3 Potential conflicts of interest are identified and involved parties of potential conflicts are notified. 1.4 Proprietary rights of client/customer is asserted.
2. Deliver quality products and services	2.1. Products and services are provided according to the clients' requirements. 2.2. Work is completed as per standards. 2.3. Quality processes are implemented when developing products and services.
3. Maintain professionalism at workplace	3.1 Work processes are delivered as per standards. 3.2 Skills, knowledge and qualifications are presented in a professional manner. 3.3 Services and products developed by self and others are delivered as per workplace standard. 3.4 Unbiased and objective information are provided to clients. 3.5 Realistic estimates for time, cost and delivery of outputs are presented during negotiation.
4. Maintain workplace code of conduct.	4.1 Workplace code of conduct are interpreted 4.2 Workplace code of conduct is followed.
Range of variables	
Variables	**Range** (may include but not limited to):
Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent and recent and meet the requirements of the current version of the Unit of Competency	

1. Critical aspects of competency	Assessment required evidence that the candidate: 1.1 asserted proprietary rights of client/customer. 1.2 completed work to industry and international standards. 1.3 implemented quality processes when developing products and services. 1.4 delivered services and products developed by self and others. 1.5 provided unbiased and objective information to clients. 1.6 followed workplace code of conduct.
2. Underpinning knowledge	2.1. Corporate code of confidentiality of information 2.2. organizational policies, national legislation and workplace policies in relation to IT sector 2.3. Law and regulations pertaining to proprietary rights 2.4. Quality processes for products and services 2.5. Procedure of provided to client information 2.6. Method of estimating for time, cost and delivery products and services 2.7. Workplace code of conduct in IT sector
3. Underpinning Skills	3.1. Upholding confidentiality of information in accordance with organizational policies, national legislation and workplace policies 3.2. Asserting proprietary rights of client/customer 3.3. Completing work in accordance with industry and international standards 3.4. Implementing quality processes when developing products and services 3.5. Delivering correctly services and products developed by self and others 3.6. Providing unbiased and objective information are to clients. 3.7. Presenting realistic estimates for time, cost and delivery of outputs during negotiation 3.8. Following workplace code of conduct
4. Underpinning Attitudes	4.1 Commitment to occupational health and safety 4.2 Promptness in carrying out activities 4.3 Sincere and honest to duties 4.4 Environmental concerns 4.5 Eagerness to learn 4.6 Tidiness and timeliness 4.7 Respect for rights of peers and seniors in workplace 4.8 Communication with peers and seniors in workplace.
5. Resource Implications	The following resources must be provided: 5.1 Relevant tools, Equipment, software and facilities needed to perform the activities. 5.2 Required learning materials.

6. Methods of Assessment	6.1 Written Test 6.2 Demonstration 6.3 Oral Questioning
7. Context of Assessment	7.1. Competency assessment must be done in NSDA accredited center. 7.2. Assessment should be done by NSDA certified/ nominated assessor

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Occupation Specific Units of Competencies

Unit Code and Title	**OU-ICT-WDDN-01-L4-V1: Apply Basic C#**
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to apply basic C#. It specifically includes the tasks of working with variables, applying C# basic data type, controlling program flow, working with various loops, array, collection, and implementing data structure and algorithm.
Nominal Hours	**30 Hours**
Elements of Competency	**Performance Criteria** **Bold & underlined** terms are elaborated in the Range of Variables
1. Work with variables	1.1 Variables in computer memory are described. 1.2 Convention of C# code is named. 1.3 A string type variable is declared and assigned. 1.4 Value of a variable in console is shown. 1.5 Running a Dot Net environment program in a computer is applied. 1.6 A single statement type of variable is declared or assigned. 1.7 One variable on each line is declared and assigned. 1.8 Allocated memory of execution engine for local variable is explained. 1.9 Local variable declaration and assignment syntax is declared and assigned. 1.10 Implicitly typed variables are declared 1.11 Anatomy of a C# program and Visual studio IDE is applied.
2. Apply C# basic data type	2.1. **C# data type** is interpreted. 2.2. Data type conversion is performed 2.3. Data type formatting is performed
3. Control program flow	3.1 The "if. Else" statement is described. 3.2 Program logic using "if-then-else" is controlled. 3.3 Switch statement is applied
4. Work with various loops	4.1 **Loops** are interpreted. 4.2 Loop control statements are used. 4.3 Continue and break in loops are implemented 4.4 Various loops are used.
5. Work with array	5.1 Array is introduced. 5.2 Array functions are used. 5.3 Array traversing is performed. 5.4 Array dimensions are used.
6. Work with collection	6.1 **Collections** are interpreted 6.2 Collections are implemented 6.3 Generic collections are implemented
7. Implement data structure and algorithm	7.1. Sorting algorithms are implemented 7.2. Searching algorithms are implemented

Range of Variables	
Variables	**Range** (may include but not limited to):
1. C# data type	1.1 Primitive data types 1.2 User defined datatypes 1.3 Value type 1.4 Reference type
2. loops	2.1. For 2.2. While 2.3. Do-while 2.4. Foreach
3. Collections	3.1. List 3.2. Arraylist 3.3. Stack 3.4. Queue 3.5. Sorted list 3.6. Hashtable 3.7. Dictionary
Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent, recent and meet all requirements of current version of the Unit of Competency.	
1. Critical aspects of competency	Assessment required evidence that the candidate: 1.1 worked with variables 1.2 applied with c# basic data type 1.3 controlled program flow 1.4 worked with various loops 1.5 worked with array 1.6 worked with collection 1.7 implemented data structure and algorithm
2. Underpinning knowledge	2.1 Data structure and algorithm 2.2 Variable in computer memory 2.3 Naming convention of C# code and procedure 2.4 Method of showing value of a variable in console 2.5 Type of declared or assigned variables in a single statement. 2.6 Introduction of C# data type. 2.7 Value type vs Reference type 2.8 Introduction to loops 2.9 The different types of loop 2.10 Techniques of introducing array and array list 2.11 The difference between array and array list

3. Underpinning skills	3.1 Using a computer 3.2 Using .Net environment
4. Underpinning attitude	4.1 Commitment to occupational health and safety 4.2 Promptness in carrying out activities 4.3 Sincere and honest to duties 4.4 Environmental concerns 4.5 Eagerness to learn 4.6 Tidiness and timeliness 4.7 Respect for rights of peers and seniors in workplace 4.8 Communication with peers and seniors in workplace
5. Resource implications	The following resources must be provided: 5.1 Course materials 5.2 PowerPoint presentation 5.3 Laptop, projector 5.4 Internet connection
6. Methods of assessment	Methods of assessment may include but not limited to: 6.1 Demonstration 6.2 Oral questioning 6.3 Written test 6.4 Portfolio
7. Context of assessment	7.1 Competency assessment must be done in NSDA accredited center. 7.2 Assessment should be done by NSDA certified/ nominated assessor

Accreditation Requirements

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Unit Code and Title	**OU-ICT-WDDN-02-L4-V1: Work with Object Oriented Programming (OOP) Basics**
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to work with object oriented programming (OOP) basics. It specifically includes the tasks of working with class and objects, creating association, inheritance, and working with abstract class, method and interface.
Nominal Hours	**45 Hours**
Elements of Competency	**Performance Criteria** **Bold & underlined** terms are elaborated in the Range of Variables
1. Work with class and objects	1.1 Thinking in object-oriented way is explained. 1.2 Classes and objects are defined. 1.3 Field, property and method inside a class are kept. 1.4 Constructors are implemented 1.5 Encapsulation and data hiding are performed 1.6 Overloading is performed
2. Create association	2.1. Association **relationship**s defined. 2.2. Association relationship between objects is defined. 2.3. A class with the collection of another class is created.
3. Create inheritance	3.1 The essence of inheritance relationship is interpreted. 3.2 Inheritance is implemented. 3.3 Polymorphism is implemented. 3.4 Static class and method from real life example are defined.
4. Work with abstract class, method and interface	4.1 Abstract class method and interface are introduced. 4.2 Abstract class and interface are differentiated. 4.3 Interface as a type is used. 4.4 Abstract class is declared.
Range of Variables	
Variables	**Range** (may include but not limited to):
1. Relationship	1.1 One-to-one 1.2 One-to-many 1.3 Many -to- one 1.4 Many-to-many
Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent, recent and meet all requirements of current version of the Unit of Competency.	
1. Critical aspects of competency	Assessment required evidence that the candidate: 1.1 worked with class and objects 1.2 created association

	1.3 created inheritance 1.4 worked with abstract class, method and interface
2. Underpinning knowledge	2.1 Method of creating user defined type 2.2 Procedure of keeping field, property and method inside a class 2.3 Definition of association relationship 2.4 The essence of inheritance relationship 2.5 Polymorphism 2.6 Method Overriding 2.7 Virtual and sealed 2.8 Definition of static class and method from real life example 2.9 Difference between abstract class and interface 2.10 SOLID design principles
3. Underpinning skills	3.1 Working with variables 3.2 Applying with C# basic data type 3.3 Controlling program flow 3.4 Working with various loops 3.5 Working with array 3.6 Working with collection 3.7 Implementing data structure and algorithm
4. Underpinning attitude	4.1 Commitment to occupational health and safety 4.2 Promptness in carrying out activities 4.3 Sincere and honest to duties 4.4 Environmental concerns 4.5 Eagerness to learn 4.6 Tidiness and timeliness 4.7 Respect for rights of peers and seniors in workplace 4.8 Communication with peers and seniors in workplace
5. Resource implications	The following resources must be provided: 5.1 Course materials 5.2 PowerPoint presentation 5.3 Software tools 5.4 Laptop, projector 5.5 Internet connection
6. Methods of assessment	Methods of assessment may include but not limited to: 6.1 Written test 6.2 Demonstration 6.3 Oral questioning 6.4 Portfolio

7. Context of assessment	7.1 Competency assessment must be done in NSDA accredited center. 7.2 Assessment should be done by NSDA certified/ nominated assessor
Accreditation Requirements Training Providers must be accredited by National Skills Development Authority (NSDA), the National Quality Assurance Body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of qualification under NSQF. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.	

Unit Code and Title	**OU-ICT-WDDN-03-L4-V1: Use C# essential features**
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to use C# essential features. It specifically includes the tasks of Applying error handling, event delegate and lambda expression, and implementing LINQ.
Nominal Hours	**30 Hours**
Elements of Competency	**Performance Criteria** **<u>Bold & underlined</u>** terms are elaborated in the Range of Variables
1. Apply error handling	1.1 Try-catch is implemented 1.2 Throwing error is implemented 1.3 Stack trace is implemented
2. Apply event delegate and lambda expression	2.1. Anonymous type is used 2.2. Anonymous method is used 2.3. Delegate is implemented 2.4. Lambda expression is used 2.5. Event is implemented
3. Implement LINQ	3.1 LINQ is interpreted 3.2 LINQ classical approach is implemented 3.3 LINQ method chain is implemented
Range of Variables	
Variables	**Range** (may include but not limited to):
Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent, recent and meet all requirements of current version of the Unit of Competency.	
1. Critical aspects of competency	Assessment required evidence that the candidate: 1.1 applied error handling 1.2 applied event delegate and lambda expression 1.3 implemented LINQ
2. Underpinning knowledge	2.1 .Net Framework 2.2 .Net Standard 2.3 .Net Core 2.4 CLR, CTS, CIL 2.5 Error handling procedure 2.6 Anonymous type 2.7 Anonymous method 2.8 Lambda expression 2.9 LINQ

3. Underpinning skills	3.1 Working with class and objects 3.2 Creating association 3.3 Creating inheritance 3.4 Working with abstract class, method and interface
4. Underpinning attitude	4.1 Commitment to occupational health and safety 4.2 Promptness in carrying out activities 4.3 Sincere and honest to duties 4.4 Environmental concerns 4.5 Eagerness to learn 4.6 Tidiness and timeliness 4.7 Respect for rights of peers and seniors in workplace 4.8 Communication with peers and seniors in workplace
5. Resource implications	The following resources must be provided: 5.1 Course materials 5.2 PowerPoint presentation 5.3 Software tools 5.4 Laptop, projector 5.5 Internet connection
6. Methods of assessment	Methods of assessment may include but not limited to: 6.1 Written test 6.2 Demonstration 6.3 Oral questioning 6.4 Portfolio
7. Context of assessment	7.1 Competency assessment must be done in NSDA accredited center. 7.2 Assessment should be done by NSDA certified/ nominated assessor

Accreditation Requirements

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Unit Code and Title	**OU-ICT-WDDN-04-L4-V1: Work with Web Design**
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to work with web design It specifically includes the tasks of defining the working principle of the web, using HTML (Hypertext Mark-up Language), implementing Cascading Style Sheets (CSS) in a website, using JavaScript in a website.
Nominal Hours	**50 Hours**
Elements of Competency	**Performance Criteria** **Bold & underlined** terms are elaborated in the Range of Variables
1. Define the working principle of the web	1.1 Different Eras of web are discussed. 1.2 Static websites and dynamic websites are compared. 1.3 Web browsers are elaborated and differentiated. 1.4 Different types of websites are compared. 1.5 Principle of the web operation is defined.
2. Use HTML (Hypertext Mark-up Language)	2.1. **Entities & attributes** of HTML is explained. 2.2. HTML code is written using **editor** 2.3. **HTML blocks** are implemented. 2.4. HTML forms are identified. 2.5. HTML form elements are used. 2.6. HTML input types are used. 2.7. HTML input attributes are used. 2.8. **HTML Graphics** are used. 2.9. **HTML Media** is used. 2.10. HTML of a website is written.
3. Implement Cascading Style Sheets (CSS) in a website	3.1 CSS (Cascading Style Sheets) is described. 3.2 Role of CSS is explained. 3.3 CSS is applied. 3.4 The **basic concepts** of CSS are implemented. 3.5 CSS box model and positioning is explained. 3.6 CSS grid and flex box are implemented. 3.7 CSS transition and gradients are explained. 3.8 Media quires and responsive design are implemented 3.9 **CSS framework** are used
4. Use JavaScript in a website	4.1 Client Side Scripting language is demonstrated. 4.2 **JavaScript core components** are understood. 4.3 The basic Java Scripting concepts are implemented. 4.4 **Modern JavaScript** is used.

Range of Variables	
Variables	**Range** (may include but not limited to):
1. Entities and attributes	1.1 HTML Introduction

	1.2 HTML Editors 1.3 HTML Attributes 1.4 HTML Headings 1.5 HTML Paragraphs 1.6 HTML Styles 1.7 HTML Formatting 1.8 HTML Quotations 1.9 HTML Comments 1.10 HTML Colors 1.11 HTML CSS 1.12 HTML Links 1.13 HTML Images 1.14 HTML Tables 1.15 HTML Lists 1.16 HTML Blocks 1.17 HTML Classes 1.18 HTML Layout 1.19 HTML Iframes 1.20 HTML Head 1.21 HTML Entities 1.22 HTML Symbols 1.23 HTML URL Encode
2. Editor	2.1. Notepad^{++} 2.2. Sublime Text 2.3. VS Code 2.4. Visual Studio
3. HTML blocks	3.1 Elements 3.2 HTML Editors 3.3 Attributes 3.4 Headings 3.5 Paragraphs 3.6 Formatting 3.7 Links 3.8 Head 3.9 Images Tables 3.10 Lists 3.11 Block 3.12 Layout 3.13 Forms 3.14 IFrames 3.15 Colors 3.16 Entities 3.17 URL Encode

	3.18 Form 3.19 Media 3.20 Object 3.21 Audio 3.22 Video
4. HTML Graphics	4.1 HTML Canvas 4.2 HTML SVG
5. HTML Media	5.1 HTML Video 5.2 HTML Audio 5.3 HTML Plug-ins 5.4 HTML YouTube
6. Basic concepts	6.1 CSS Introduction 6.2 CSS Syntax 6.3 CSS Colors 6.4 CSS Color HEX 6.5 CSS Backgrounds 6.6 CSS Borders 6.7 CSS Margins 6.8 CSS Padding 6.9 CSS Height/ Width 6.10 CSS Text 6.11 CSS Fonts 6.12 CSS Links 6.13 CSS Lists 6.14 CSS Id & Class 6.15 CSS Box model 6.16 CSS Outline 6.17 CSS Display 6.18 CSS Max-width 6.19 CSS Position 6.20 CSS Float 6.21 CSS Inline-block 6.22 CSS Align 6.23 CSS Navigation Bar 6.24 CSS Dropdowns 6.25 CSS Image gallery 6.26 CSS Image opacity 6.27 CSS Image sprites 6.28 CSS Forms 6.29 CSS Dimension 6.30 CSS Tables 6.31 CSS Counters

7. CSS framework	7.1 Bootstrap 7.2 Tailwind
8. JavaScript core components	8.1 Variables 8.2 Functions 8.3 Loops 8.4 Conditions 8.5 Switches 8.6 Objects 8.7 Arrays 8.8 Output 8.9 Comments 8.10 Data Types 8.11 Operators 8.12 Comparisons 8.13 Breaks 8.14 Errors 8.15 DOM manipulation
9. Modern JavaScript	9.1 ES6+ 9.2 jQuery

Evidence Guide

The evidence must be authentic, valid, sufficient, reliable, consistent, recent and meet all requirements of current version of the Unit of Competency.

1. Critical aspects of competency	Assessment required evidence that the candidate: 1.1 used HTML (Hypertext Mark-up Language) 1.2 implemented Cascading Style Sheets (CSS) in a website 1.3 used JavaScript in a website
2. Underpinning knowledge	2.1 The different Eras of Web 2.2 Comparison of static websites with dynamic websites 2.3 Elaboration and differentiation with web browsers 2.4 Principles of how web works 2.5 Identification of HTML forms 2.6 CSS (Cascading Style Sheets) 2.7 CSS box model and positioning 2.8 CSS transition and gradients 2.9 Color and font using CSS 2.10 Client Side Scripting language 2.11 JavaScript core components
3. Underpinning skills	3.1 Using a computer 3.2 Working with HTML editors 3.3 Writing HTML code of a website

4. Underpinning attitude	4.1 Commitment to occupational health and safety 4.2 Promptness in carrying out activities 4.3 Sincere and honest to duties 4.4 Environmental concerns 4.5 Eagerness to learn 4.6 Tidiness and timeliness 4.7 Respect for rights of peers and seniors in workplace 4.8 Communication with peers and seniors in workplace
5. Resource implications	The following resources must be provided: 5.1 Course materials 5.2 PowerPoint presentation 5.3 Laptop, projector 5.4 Internet facility
6. Methods of assessment	Methods of assessment may include but not limited to: 6.1 Written test 6.2 Demonstration 6.3 Oral questioning 6.4 Portfolio
7. Context of assessment	7.1 Competency assessment must be done in NSDA accredited center. 7.2 Assessment should be done by NSDA certified/ nominated assessor

Accreditation Requirements

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Unit Code and Title	**OU-ICT-WDDN-05-L3-V1: Work with Relational Database Management**
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to work with relational database management. It specifically includes the tasks of interpret Databases basics, working with Database Management Systems (DBMS), creating database for web application and implementing views, stored procedure and functions.
Nominal Hours	**45 Hours**
Elements of Competency	**Performance Criteria** **Bold & underlined** terms are elaborated in the Range of Variables
1. Interpret Databases basics	1.1 **Basic database** concepts are recognized. 1.2 The necessity of relational database for keeping user data is understood. 1.3 The difference between free database and licensed database is identified. 1.4 The role of database in web applications is interpreted.
2. Work with Database Management Systems (DBMS)	2.1 Options and features of different database management systems is compared. 2.2 **Database management system** is installed. 2.3 Entities and their attributes from a real life scenario are discovered. 2.4 The relationship between entities and their attributes to draw an E-R diagram is defined.
3. Create Database for Web application	3.1 **Database design** is performed for a web project. 3.2 Indexing and cascading to the database is implemented. 3.3 **Data Manipulation** is performed. 3.4 SQL queries to retrieve data are written.
4. Implement views, stored procedure and functions	4.1. SQL views are implemented 4.2. SQL functions are declared and implemented. 4.3. Stored procedure is called, modified and deleted.
Range of Variables	
Variables	**Range** (may include but not limited to):
1. Basic database	1.1 Entities 1.2 Attributes 1.3 Records 1.4 Fields 1.5 Row 1.6 Column 1.7 Table

	1.8 Data types 1.9 Keys 1.10 Relationships 1.11 Normalization 1.12 Denormalization 1.13 Queries 1.14 Joining 1.15 Indexing 1.16 Entity Relationship Diagram
2. Database management systems	2.1 Microsoft SQL Server 2.2 MySQL 2.3 PostgreSQL
3. Database design	3.1 Tables creation 3.2 Creation of Entity Relationship Diagram 3.3 Normalization of the Entity Relationship Diagram 3.4 De-normalization of the Entity Relationship Diagram
4. Data Manipulation	4.1 Create schema 4.2 Create table 4.3 Create report 4.4 Insert data 4.5 Select data 4.6 Delete data 4.7 Update data 4.8 Filtering data 4.9 Retrieve data 4.10 Join queries
Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent, recent and meet all requirements of current version of the Unit of Competency.	
1. Critical aspects of competency	Assessment required evidence that the candidate: 1.1 created database of a Website in a Database Management System. 1.2 implemented views, stored procedure and functions
2. Underpinning knowledge	2.1 Basic database concepts 2.2 Difference between free database and licensed database 2.3 Comparison of options and features of different database management systems 2.4 Entities and their attributes from a real life scenario 2.5 Introduction of stored procedure in database 2.6 Method of describing stored procedures encapsulate functionality 2.7 Isolation of users from data tables 2.8 Migration to a different database management system

3. Underpinning skills	3.1 Working database management systems 3.2 Entering data 3.3 Designing a database of a web project 3.4 Writing SQL commands
4. Underpinning attitude	4.1 Commitment to occupational health and safety 4.2 Promptness in carrying out activities 4.3 Sincere and honest to duties 4.4 Environmental concerns 4.5 Eagerness to learn 4.6 Tidiness and timeliness 4.7 Respect for rights of peers and seniors in workplace 4.8 Communication with peers and seniors in workplace
5. Resource implications	The following resources must be provided: 5.1 Course materials 5.2 PowerPoint presentation 5.3 Software tools 5.4 Laptop, projector 5.5 Internet connection
6. Methods of assessment	Methods of assessment may include but not limited to: 6.1 Demonstration 6.2 Oral questioning 6.3 Written test 6.4 Portfolio
7. Context of assessment	7.1 Competency assessment must be done in NSDA accredited center. 7.2 Assessment should be done by NSDA certified/ nominated assessor

Accreditation Requirements

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Unit Code and Title	**OU-ICT-WDDN-06-L4-V1: Apply Web Programming Basics using Asp.Net MVC**
Unit Descriptor	This unit covers the knowledge, skills and attitudes to apply web programming basics using Asp.Net MVC. It specifically includes the tasks of applying the basic terminologies of MVC (model–view–controller), Utilizing ASP.Net MVC, using entity framework (EF), working with Model and View, .Net core fundamentals, REST API, authentication and authorization, and deploying web application.
Nominal Hours	**45 Hours**
Elements of Competency	**Performance Criteria** **Bold & underlined** terms are elaborated in the Range of Variables
1. Apply the basic terminologies of MVC (model–view–controller)	1.1 Vocabularies of ASP.Net MVC is identified. 1.2 Basic terminologies of MVC is described. 1.3 Controllers and actions are applied. 1.4 Action parameter binding is implemented. 1.5 HTTP verb binding is implemented. 1.6 Razor Syntax is used. 1.7 **Razor helpers** are used.
2. Utilize ASP.Net MVC	2.1. Database in ASP.Net MVC is used. 2.2. JavaScript and jQuery in ASP.Net MVC is introduced. 2.3. JavaScript and JQuery in ASP.Net MVC is used.
3. Use entity framework (EF)	3.1 Object Relational Mapper (ORM) is interpreted. 3.2 DbContext and DbSet are implemented. 3.3 Migration is implemented. 3.4 Entity relationship is implemented. 3.5 Fluent API configuration is implemented. 3.6 Stored procedure, views and Raw SQL in EF are used.
4. Work with Model and View	4.1 Model is described. 4.2 Model binding is implemented 4.3 Model validation is implemented. 4.4 Strongly typed model is implemented in view. 4.5 View model is used 4.6 Tag helpers are implemented. 4.7 HTML reporting is performed
5. Work with .Net core fundamentals	5.1 Dependency injection is implemented 5.2 Middleware is implemented 5.3 Configuration is implemented 5.4 Logger is implemented 5.5 Routing is interpreted and implemented

6. Work with REST API	6.1 HTTP verbs are interpreted 6.2 HTTP status code is interpreted 6.3 Controller and action implementation in API is performed 6.4 API client is used
7. Work with authentication and authorization	7.1. ASP .Net identity is implemented 7.2. Role based authorization is implemented 7.3. Policy based authorization is implemented 7.4. JWT token authorization is implemented
8. Deploy web application	8.1. Publishing wizard is used 8.2. Kestrel hosting is interpreted 8.3. Reverse proxy is interpreted 8.4. Application is hosted in **web server**
Range of Variables	
Variables	**Range** (may include but not limited to):
1. Razor helper	1.1 Web Grid 1.2 Web Graphics 1.3 Google Analytics 1.4 Facebook Integration 1.5 Twitter Integration 1.6 Sending Email 1.7 Validation
2. Web server	2.1. IIS 2.2. Azure 2.3. Apache 2.4. Nginx
Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent, recent and meet all requirements of current version of the Unit of Competency.	
1. Critical aspects of competency	Assessment required evidence that the candidate: 1.1 utilized ASP.Net MVC 1.2 used entity framework (EF) 1.3 worked with Model and View 1.4 worked with .Net core fundamental 1.5 worked with REST API 1.6 worked with authentication and authorization 1.7 deployed web application
2. Underpinning knowledge	2.1 Vocabularies of ASP.Net MVC 2.2 Basic terminologies of MVC 2.3 Demonstration procedure of controller and action 2.4 Method of using razor syntax 2.5 Method of using razor helpers 2.6 Introduction toDBcontext and DBset in ASP.Net MVC

	2.7 Introduction to Java script and JQueryin ASP.Net MVC 2.8 Method of describing about the model 2.9 Method of using of multiple model
3. Underpinning skills	3.1 Working with ASP.Net MVC 3.2 Working with database 3.3 working with model
4. Underpinning attitude	4.1 Commitment to occupational health and safety 4.2 Promptness in carrying out activities 4.3 Sincere and honest to duties 4.4 Environmental concerns 4.5 Eagerness to learn 4.6 Tidiness and timeliness 4.7 Respect for rights of peers and seniors in workplace 4.8 Communication with peers and seniors in workplace
5. Resource implications	The following resources must be provided: 5.1 Course materials 5.2 PowerPoint presentation 5.3 Software tools 5.4 Laptop, projector 5.5 Internet connection
6. Methods of assessment	Methods of assessment may include but not limited to: 6.1 Demonstration 6.2 Oral questioning 6.3 Written test 6.4 Portfolio
7. Context of assessment	7.1 Competency assessment must be done in NSDA accredited center. 7.2 Assessment should be done by NSDA certified/ nominated assessor

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Unit Code and Title	**OU-ICT-WDDN-07-L4-V1 Perform Project Work with ASP.Net**
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to perform project work with ASP.Net. It specifically includes the tasks of interpreting project management basics, developing an application in ASP.Net, developing user story, performing unit testing, creating project presentation, and developing awareness about rights.
Nominal Hours	**50 Hours**
Elements of Competency	**Performance Criteria** **Bold & underlined** terms are elaborated in the Range of Variables
1. Interpret project management basics	1.1 Concepts of project management is interpreted 1.2 Resource management is interpreted 1.3 Process management is interpreted 1.4 Technology management is interpreted 1.5 Team communication and reporting are acknowledged
2. Develop an application in ASP.Net	2.1. **Software development life cycle (SDLC) models** are identified 2.2. Project model is selected as per project requirement. 2.3. Key principles of selected model are implemented. 2.4. User interface of a web application is designed. 2.5. Git as a source control system is used. 2.6. Web application is developed.
3. Develop user story	3.1 User story is explained. 3.2 Story estimated. 3.3 User stories of a project work is defined. 3.4 **Project management tool** is used. 3.5 Project stories are made.
4. Perform unit testing	4.1. Test cases are identified 4.2. **Testing tools** are used
5. Create project presentation	5.1. Project **document** is created. 5.2. Final project presentation in a group and/or individual is created.
6. Develop awareness about rights	6.1 The policies, rules and regulations that govern the work and workplace are upheld. 6.2 Illegal conduct or illegitimate action is reported to appropriate management. 6.3 Propriety or confidential information is protected.
Range of Variables	
Variables	**Range** (may include but not limited to):

1. Software development life cycle (SDLC) models	Plan driven models 1.1 Waterfall 1.2 V shaped 1.3 Re-used Agile models 1.4 Scrum 1.5 Extreme Programming (XP) 1.6 Incremental Model
2. Project management tool	2.1 Jira 2.2 Trello 2.3 Asana 2.4 Azure DevOps 2.5 Github boards
3. Testing tools	3.1. xUnit 3.2. MSTest 3.3. Moq
4. Document	4.1 Analysis document 4.2 Design document 4.3 Implementation document 4.4 Testing document 4.5 Deployment document 4.6 Maintenance and support document 4.7 User manual
Evidence Guide The evidence must be authentic, valid, sufficient, reliable, consistent, recent and meet all requirements of current version of the Unit of Competency.	
1. Critical aspects of competency	Assessment required evidence that the candidate: 1.1 developed an application in ASP.Net 1.2 developed user story 1.3 performed unit testing 1.4 created project presentation 1.5 developed awareness about rights
2. Underpinning knowledge	2.1 Key principles of agile project management 2.2 The user story 2.3 Define user stories definitions of project work 2.4 Familiarizing with the Trello. 2.5 Policies, rules/regulations that govern the work and workplace. 2.6 Procedure of reporting illegal conduct or illegitimate action to appropriate management.
3. Underpinning skills	3.1 Developing a static or dynamic website in a web development software 3.2 Implementing software development life cycle (SDLC) phases in a web project 3.3 Estimating a story

	3.4 Creating project in Trello 3.5 Assigning a card to a group member 3.6 Working with project stories 3.7 Creating a project document 3.8 Making a final project presentation in a group and/or individual. 3.9 Protecting propriety or confidential information.
4. Underpinning attitude	4.1 Commitment to occupational health and safety 4.2 Promptness in carrying out activities 4.3 Sincere and honest to duties 4.4 Environmental concerns 4.5 Eagerness to learn 4.6 Tidiness and timeliness 4.7 Respect for rights of peers and seniors in workplace 4.8 Communication with peers and seniors in workplace
5. Resource implications	The following resources must be provided: 5.1 Course materials 5.2 Laptop, projector 5.3 Internet connection
6. Methods of assessment	Methods of assessment may include but not limited to: 6.1 Demonstration 6.2 Oral questioning 6.3 Written test 6.4 Portfolio
7. Context of assessment	7.1 Competency assessment must be done in NSDA accredited center. 7.2 Assessment should be done by NSDA certified/ nominated assessor
Accreditation Requirements Training Providers must be accredited by National Skills Development Authority (NSDA), the National Quality Assurance Body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of qualification under NSQF. Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by NSDA.	

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Development of Competency Standard

The Competency Standards for National Skills Certificate in Web Application Development with ASP.Net, Level-4 is developed by SEIP on 20th March 2016.

List of Members

S/N	Name and Address	Position in the committee
1.	Mr. Md. Mokhlesur Rahman, CEO, SPONDON	Member
2.	Mr. MdFaruk Hossain, Team Leader, Graphic Design, Bording Vista Ltd.	Member
3.	Mrs. Sayma Begum, Asst. Trainer, BITM	Member
4.	Mr. ZohirulAlamTiemoon, CEO, Nerd Castle, Ltd	Member
5.	Mr. Tayabur Rahman Masud, Asst. Trainer, BITM	Member
6.	Mr. Mian Zadid Rusdid, Lead Trainer, BITM	Member
7.	Mr. Khondoker Ali Asgor Pavel, CEO, BitBirds Solution	Member
8.	Md. Hasib, Executive, IT, BITM	Member
9.	Sifat-E-Tanzim, Software Engineer, Liveoutsource,Ltd.	Member

Validation of Competency Standard

The Competency Standards for National Skills Certificate in Web Application Development with ASP.Net, Level-4 is validated by NSDA on 12 September 2022.

List of Members of the SCVC

S/N	Name and Address	Position in the committee	Signature and Date
1.	Shafquat Haider, Chairman, ICT ISC, ciproco@bol-online.com, shafquat.haider@gmail.com, Mobile No. 01711532597	Chairperson	
2.	Dr. Ahmedul Kabir, Assistant Professor, Institute of Information Technology,Dhaka University, Email: kabir@iit.du.ac.bd, Mobile: 01875179981	Member	
3.	Kazi Hassan Robin, Associate Professor (CSE), World University of Bangladesh, Email: robin1@cse.wub.edu.bd, Mobile: 01820547352	Member	
4.	Manash Sarker, Lecturer, Computer and Communication Engineering (CCE) Department, Patuakhali Science and Technology University (PSTU), E-mail: manash.sarker@pstu.ac.bd, Mobile: 01712149555	Member	
5.	Md. Azman Ali, Sr. Faculty (C# .Net), PeopleNTech Institute of IT, Email : azman6364@gmail.com, Mobile: 01795885845	Member	
6.	Md Shirajul Islam Mamun, CEO, Founder Enlight Solutions, Email: shirajul.mamun@gmail.com, Mobile: 01710318199	Member	
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