Qualification Specification for:

OCN NI Level 4 Diploma in Software Testing

- **Qualification No: 603/5262/0**

Qualification Regulation Information

OCN NI Level 4 Diploma in Software Testing
Qualification Number: 603/5262/0

Operational start date: 15 November 2019
Operational end date: 31 October 2024
Certification end date: 31 October 2028

Qualification operational start and end dates indicate the lifecycle of a regulated qualification. The operational end date is the last date by which learners can be registered on a qualification and the certification end date is the last date by which learners can claim their certificate.

All OCN NI regulated qualifications are published to the Register of Regulated Qualifications (**http://register.ofqual.gov.uk/**). This site shows the qualifications and awarding organisations regulated by CCEA Regulation and Ofqual.

OCN NI Contact Details

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Foreword

This document explains OCN NI's requirements for the delivery and assessment of the following regulated qualification:

- **OCN NI Level 4 Diploma in Software Testing**

This specification sets out:

- Qualification features
- Centre requirements for delivering and assessing the qualification
- The structure and content of the qualification
- Unit details
- Assessment requirements for the qualification
- OCN NI's quality assurance arrangements for the qualification
- Administration

OCN NI will notify centres in writing of any major changes to this specification. We will also publish changes on our website at **www.ocnni.org.uk**

This specification is provided online, so the version available on our website is the most up to date publication. It is important to note that copies of the specification that have been downloaded and printed may be different from this authoritative online version.

Contents

About Regulation

OCN NI

Open College Network Northern Ireland (OCN NI) is a regulated Awarding Organisation based in Northern Ireland. OCN NI is regulated by CCEA Regulation to develop and award professional and technical (vocational) qualifications from Entry Level up to and including Level 5 across all sector areas. In addition, OCN NI is regulated by Ofqual to award similar qualification types in England.

The Regulated Qualifications Framework: an overview

The Regulated Qualifications Framework (RQF) was introduced on 1st October 2015: the RQF provides a single framework for all regulated qualifications.

Qualification Level
The level indicates the difficulty and complexity of the knowledge and skills associated with any qualification. There are eight levels (Levels 1-8) supported by three 'entry' levels (Entry 1-3).

Qualification Size
Size refers to the estimated total amount of time it could typically take to study and be assessed for a qualification. Size is expressed in terms of Total Qualification Time (TQT), and the part of that time typically spent being taught or supervised, rather than studying alone, is known as Guided Learning Hours (GLH).

Qualification Features

Sector Subject Area

6.1 ICT for Practitioners

This qualification relates to the following National Occupational Standards:

NOS - Software Testing

Qualification Aim

The aim of the OCN NI Level 4 Diploma in Software Testing is to provide a range of skills and techniques that will enable learners to create a comprehensive testing strategy. The OCN NI Level 4 Diploma in Software Testing will also assist learners to develop software testing skills to match vacancies within ICT related occupations.

Qualification Objective

The objective of the OCN NI Level 4 Diploma in Software Testing is to provide specific skills in software testing for software developers and related practitioners. An emphasis will be given to the use of test automation as a technology to enable rapid, consistent and comprehensive testing of software before release.

Grading

Grading for this qualification is pass/fail.

Qualification Target Group

The OCN NI Level 4 Diploma in Software Testing is targeted at adult learners who have reached a certain level of skills and knowledge in the areas of software development and/or software testing. There is an ongoing demand for skills in software testing and the OCN NI Level 4 Diploma in Software Testing will include the development of skills in the area of test automation which is increasingly sought after.

Progression Opportunities

The OCN NI Level 4 Diploma in Software Testing will allow learners to progress to higher level qualifications in software development and/or software testing as well as into employment within the ICT industry.

Qualification Support

A Qualification Support pack is available for OCN NI centres within the login area of the OCN NI website (https://www.ocnni.org.uk/my-account/), which includes additional support for teachers, eg planning and assessment templates, guides to best practice, etc.

Entry Requirements

Learners will be expected to have reached a basic level of skills and knowledge in the area of software development and/or software testing such that they are able to develop and test rudimentary software programs. Learners would also be expected to have achieved GCSE English and Maths at Grade C or above or equivalent. Learners should be at least 18 years old.

Delivery Languages

This qualification is available in English only at this time. If you wish to offer this qualification in Welsh or Irish (Gaeilge) then please contact OCN NI who will review demand and provide as appropriate.

Centre Requirements for Delivering the Qualification

Centre Recognition and Qualification Approval

New and existing OCN NI recognised centres must apply for and be granted approval to deliver the qualification prior to the commencement of delivery.

Centre Staffing

Centres are required to have the following roles in place as a minimum, although a member of staff may hold more than one role*:

- Centre contact
- Programme Co-ordinator
- Tutor
- Assessor
- Internal Verifier

*Note: A person cannot be an internal verifier for their own assessments.

Tutors

Tutors delivering the qualification should be occupationally competent, qualified to at least one level higher than the qualification and have a minimum of one year's relevant experience.

Assessors

The qualifications are assessed within the centre and are subject to OCN NI's quality assurance processes. Units are achieved through internally set, internally assessed, and internally verified evidence.

Assessors must:

- be occupationally competent and qualified to at least one level higher than the qualification
- have a minimum of one year's relevant experience in the area they are assessing
- have direct or related relevant experience in assessment
- assess all assessment tasks and activities

Internal Verification

OCN NI qualifications must be scrutinised through the centre's internal quality assurance processes as part of the recognised centre agreement with OCN NI. The centre must appoint an experienced and trained centre internal verifier whose responsibility is to act as the internal quality monitor for the verification of the delivery and assessment of the qualifications.

The centre must agree a working model for internal verification with OCN NI prior to delivery of the qualifications.

Internal Verifiers must:

- have at least one year's occupational experience in the areas they are internally verifying
- attend OCN NI's internal verifier training if not already completed

Internal verifiers are required to:

- support tutors and assessors
- sample assessments according to the centre's sampling strategy
- ensure tasks are appropriate to the level being assessed
- maintain up-to-date records supporting the verification of assessment and learner achievement

Structure and Content

To achieve the OCN NI Level 4 Diploma in Software Testing learners must successfully complete all units – total 54 credits.

Total Qualification Time (TQT) for this qualification: 540 hours
Guided Learning Hours (GLH) for this qualification: 324 hours

Unit Reference Number	OCN NI Unit Code	Unit Title	Credit Value	GLH	Level
L/617/8667	CBE719	Object Oriented Programming	13	78	Four
R/617/8668	CBE720	Software Testing	12	72	Four
Y/617/8669	CBE721	Structured Query Language (SQL) Fundamentals	13	78	Four
L/617/8670	CBE722	Automated Software Testing Fundamentals	16	96	Four

Unit Details

Title	Object Oriented Programming
Level	Four
Credit Value	13
Guided Learning Hours (GLH)	78
OCN NI Unit Code	CBE719
Unit Reference No	L/617/8667
Unit purpose and aim(s): This unit will enable the learner to design and implement object orientated computer programs.	
Learning Outcomes	**Assessment Criteria**
1. Understand object oriented programming and appropriate programming environments.	1.1. Explain the principles, characteristics and features of object oriented programming. 1.2. Critically evaluate the environment flexibility of programming in a given computer language.
2. Be able to design object oriented programming solutions.	2.1. Select and justify choice of objects and data file structures required to implement a given solution design. 2.2. Create a design specification for an object oriented programming solution to a given problem.
3. Be able to implement an object oriented programming solution.	3.1. Clarify relationships between objects to implement design requirements identified in AC2.2. 3.2. Configure object behaviours using control structures to meet design algorithms. 3.3. Use an Integrated Development Environment (IDE) to develop the programming solution to meet design requirements identified in AC2.2. 3.4. Demonstrate how to implement error handling and reporting to enable correct functionality.
4. Be able to test and document object oriented programming solutions.	4.1. Test the object orientated programming solution developed in AC3.3. 4.2. Analyse test results obtained in AC4.1 against expected results, identifying possible discrepancies. 4.3. Create onscreen help to assist the users of the object orientated programming solution developed in AC3.3. 4.4. Create user documentation to assist with support and maintenance of the object orientated programming solution developed in AC3.3. 4.5. Evaluate feedback on the object orientated programming solution developed in AC3.3 and make recommendations for improvements.

Assessment Guidance		
The following assessment method/s may be used to ensure all learning outcomes and assessment criteria are fully covered.		
Assessment Method	**Definition**	**Possible Content**
Portfolio of evidence	A collection of documents containing work undertaken to be assessed as evidence to meet required skills outcomes OR A collection of documents containing work that shows the learner's progression through the course	Learner notes/written work Learner log/diary Peer notes Record of observation Record of discussion
Practical demonstration/assignment	A practical demonstration of a skill/situation selected by the tutor or by learners, to enable learners to practise and apply skills and knowledge	Record of observation Learner notes/written work Learner log
Coursework	Research or projects that count towards a learner's final outcome and demonstrate the skills and/or knowledge gained throughout the course	Record of observation Learner notes/written work Tutor notes/record Learner log/diary
E-assessment	The use of information technology to assess learners' work	Electronic portfolio E-tests

Title	Software Testing
Level	Four
Credit Value	12
Guided Learning Hours (GLH)	72
OCN NI Unit Code	CBE720
Unit Reference No	R/617/8668
Unit purpose and aim(s): This unit will enable the learner to understand the process of software development including lifecycle, software testing and how to design and implement software testing plans.	

Learning Outcomes	**Assessment Criteria**
1. Understand the process of software development.	1.1. Explain the stages of the software development lifecycle. 1.2. Explain the importance of communication skills, project management skills, document creation and associated processes and procedures and how they are applied.
2. Understand testing strategies, techniques and management.	2.1. Explain the stages of system testing including alpha, beta, and acceptance testing. 2.2. Explain the contents of a software test plan and how it should be managed. 2.3. Explain the purpose of unit, integration and system testing of software. 2.4. Critically compare the application of unit, integration and system testing of software. 2.5. Critically compare functional and structural testing techniques and dynamic and static testing.
3. Be able to contribute to a test process for a software solution.	3.1. Contribute to a test process for a software solution including: a) performing actions specified in test cases and record results b) comparing and reporting on actual and expected test results
4. Understand how to design a test strategy.	4.1. Develop a software testing strategy, plan and associated activities using appropriate tools. 4.2. Justify the test plan proposition and testing strategy. 4.3. Explain the various methods used to obtain data to test computer programs. 4.4. Demonstrate the use of various methods to obtain data to test computer programs.
5. Be able to implement test plans.	5.1. Implement a test plan based on the initial coding phase, unit testing and debugging. 5.2. Implement a test plan based on software integration, integration and system testing, debugging and enhancements.
6. Be able to evaluate test plans.	6.1. Critically evaluate the outcomes of the tests identified in AC5.1 and AC5.2, justifying the validity of the tests, identifying any issues with appropriate recommendations.

Assessment Guidance		
The following assessment method/s may be used to ensure all learning outcomes and assessment criteria are fully covered.		
Assessment Method	**Definition**	**Possible Content**
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Title	Structured Query Language (SQL) Fundamentals
Level	Four
Credit Value	13
Guided Learning Hours (GLH)	78
OCN NI Unit Code	CBE721
Unit Reference No	Y/617/8669
Unit purpose and aim(s): This unit will enable the learner to use database functionality, design and create a Relational Database Management System (RDMS). The learner will also be able to use Structured Query Language (SQL) to create, retrieve, update and delete data within a database.	
Learning Outcomes	**Assessment Criteria**
1. Be able to perform database operations.	1.1 Explain with examples what is meant by the concept of a table and how it is used to work with data. 1.2 Explain what a Relational Database Management System (RDMS) is and the main types of databases available. 1.3 Explain using examples the Create, Retrieve, Update and Delete (CRUD) operations available within a database. 1.4 Explain and use different types of SQL language including Data Manipulation Language (DML), Data Control Language (DCL) and Data Definition Language (DDL) to perform database operations.
2. Be able to create an RDMS composed of tables.	2.1 Explain the purpose of database normalisation and the forms available. 2.2 Explain the concept of primary, foreign and composite keys. 2.3 Create an RDMS composed of tables to include: a) database normalisation to the third normal form b) creation of appropriate keys and indices within tables to form relationships
3. Be able to develop an RDMS within a database server.	3.1 Explain the main data types, why they are important and how they affect database storage. 3.2 Interpret and create an Entity Relationship Diagram (ERD) depicting tables and relationships. 3.3 Develop and execute at least three scripts to create an RDMS within a database server.
4. Be able to develop SQL queries based on one table.	4.1 Use the SELECT statement to retrieve data from a table. 4.2 Demonstrate the removal of duplicate records from query results. 4.3 Demonstrate the filtering of data using at least three SQL operators including the WHERE clause. 4.4 Demonstrate the ordering of data using SQL ORDER BY clause.

5. Be able to develop SQL queries based on more than one table.	5.1 Summarise using examples at least five types of joins. 5.2 Demonstrate the joining of tables using at least three methods including INNER JOIN. 5.3 Demonstrate the use of the following joins: a) LEFT JOIN b) RIGHT JOIN c) OUTER JOIN
6. Be able to use SQL aggregate functions.	6.1 Explain using examples key built-in aggregate functions including SUM, AVG and COUNT. 6.2 Use the GROUP BY clause to group data. 6.3 Split groups using HAVING clause.
7. Be able to manipulate data within a database.	7.1 Explain the significance of referential integrity when carrying out Create, Read, Update and Delete (CRUD) operations. 7.2 Add new data to a table using SQL INSERT INTO. 7.3 Modify data within a table using SQL UPDATE. 7.4 Remove data from table using SQL DELETE. 7.5 Explain with examples stored procedures using Transact-SQL (T-SQL).
8. Be able to export query results.	8.1 Research and explain different types of export techniques for data available within a database. 8.2 Export query results to a universal file format.

Assessment Guidance

The following assessment method/s may be used to ensure all learning outcomes and assessment criteria are fully covered.

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Title	Automated Software Testing Fundamentals
Level	Four
Credit Value	16
Guided Learning Hours (GLH)	96
OCN NI Unit Code	CBE722
Unit Reference No	L/617/8670
Unit purpose and aim(s): This unit will enable the learner to understand the fundamentals of automated software testing. The learner will be able to use a web-based automation software testing tool.	

Learning Outcomes	**Assessment Criteria**
1. Understand what is meant by automated testing and its application.	1.1. Explain what is meant by test automation and the main two testing disciplines. 1.2. Analyse at least three different features of web applications for which automated testing would be the optimal approach.
2. Be able to research test automation practices in order to develop a software testing plan.	2.1. Research the advantages and disadvantages for test automation practices and their associated resources. 2.2. Critically compare the application of manual and automated software testing for a given application. 2.3. Develop an optimal software testing plan.
3. Be able to set up and use a web-based automated software testing tool.	3.1. Explain the setup procedures for using a web-based automated software testing tool with commonly used browsers. 3.2. Explain the importance of website navigation commands. 3.3. Demonstrate the use of website navigation commands. 3.4. Demonstrate the use of conditions to check for presence of a web element upon which actions are to be performed. 3.5. Demonstrate the effective use of exception handling when dealing with potential problems with the location of various web elements. 3.6. Demonstrate the effective use of waits when testing dynamic web pages.
4. Be able to locate and test web elements.	4.1. Explain and demonstrate at least three different techniques to reference web elements on a webpage. 4.2. Explain what is meant by the Document Object Model (DOM) and how it allows a Hypertext Markup Language (HTML) webpage to be accessed. 4.3. Demonstrate the handling of singular and multiple occurrences of web elements for test purposes.
5. Be able to manage and interact with notifications within a browser.	5.1. Critically compare at least two examples of web-based notifications and at least two examples of windows-based notifications. 5.2. Use an appropriate strategy to effectively manage and interact with the following: a) a new tab or window within a browser b) a web-based notification including alerts, pop-ups and splash screens c) a windows-based notification including dialogue boxes and pop-ups

6. Be able to research and create a test automation suite.	6.1. Research and evaluate the advantages and disadvantages of implementing a test suite. 6.2. Create a test automation suite for use with multiple test cases for test execution purposes.
7. Be able to research and create a test automation framework.	7.1. Research and evaluate the advantages and disadvantages of using a test automation framework. 7.2. Create a basic test automation framework for a given application that features reusability of code and low-cost maintenance.

Assessment Guidance

The following assessment method/s may be used to ensure all learning outcomes and assessment criteria are fully covered.

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Portfolio of evidence	A collection of documents containing work undertaken to be assessed as evidence to meet required skills outcomes OR A collection of documents containing work that shows the learner's progression through the course	Learner notes/written work Learner log/diary Peer notes Record of observation Record of discussion
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Quality Assurance of Centre Performance

External Verification

All OCN NI recognised centres are subject to External Verification. External verification visits and monitoring activities will be conducted annually to confirm continued compliance with the conditions of recognition, review the centre's risk rating for the qualifications and to assure OCN NI of the maintenance of the integrity of the qualifications.

The External Verifier will review the delivery and assessment of the qualifications. This will include the review of a sample of assessment evidence and evidence of the internal verification of assessment and assessment decisions. This will form the basis of the EV report and will inform OCN NI's annual assessment of centre compliance and risk. The External Verifier is appointed by OCN NI.

Standardisation

As a process, standardisation is designed to ensure consistency and promote good practice in understanding and application of standards. Standardisation events:

- make qualified statements about the level of consistency in assessment across centres delivering a qualification
- make statements on the standard of evidence that is required to meet the assessment criteria for units in a qualification
- make recommendations on assessment practice
- produce advice and guidance for the assessment of units
- identify good practice in assessment and internal verification

Centres offering units of an OCN NI qualification must attend and contribute assessment materials and learner evidence for standardisation events if requested.

OCN NI will notify centres of the nature of sample evidence required for standardisation events (this will include assessment materials, learner evidence and relevant assessor and internal verifier documentation). OCN NI will make standardisation summary reports available and correspond directly with centres regarding event outcomes.

Administration

Registration

A centre must register learners within 20 working days of commencement of a qualification.

Certification

Certificates will be issued to centres within 20 working days of receipt of correctly completed results marksheets. It is the responsibility of the centre to ensure that certificates received from OCN NI are held securely and distributed to learners promptly and securely.

Charges

OCN NI publishes all up to date qualification fees in its Fees and Invoicing Policy document. Further information can be found on the centre login area of the OCN NI website.

Equality, Fairness and Inclusion

OCN NI has considered the requirements of equalities legislation in developing the specification for these qualifications. For further information and guidance relating to access to fair assessment and the OCN NI Reasonable Adjustments and Special Considerations policies, centres should refer to the OCN NI website.

Retention of Evidence

OCN NI has published guidance for centres on the retention of evidence. Details are provided in the OCN NI Centre Handbook and can be accessed via the OCN NI website.

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