



## Higher National Unit specification

### General information

**Unit title:** Client Side Scripting for Web Applications (SCQF level 7)

**Unit code:** HF4X 34

**Superclass:** CE

**Publication date:** July 2016

**Source:** Scottish Qualifications Authority

**Version:** 01

### Unit purpose

This Unit is designed to introduce learners to the fundamental concepts of programming using scripting languages. The Unit involves combining both client-side scripts and HTML to enable the creation of dynamic client based web pages. It is intended for learners who already have some understanding of HTML and the fundamental requirements of creating static web pages.

### Outcomes

On successful completion of the Unit the learner will be able to:

- 1 Describe client-side scripting features.
- 2 Implement programming elements associated with client-side scripting languages.
- 3 Implement and test a web application using client-side scripting elements.

### Credit points and level

2 Higher National Unit credits at SCQF level 7: (16 SCQF credit points at SCQF level 7)

### Recommended entry to the Unit

Access to this Unit will be at the discretion of the centre. However, it is recommended that learners have prior basic knowledge in developing simple web pages using HTML (Hyper Text Mark-up Language) and also programming concepts associated with software development. This may be demonstrated by the possession of any relevant National 5 Unit, such as: H223 75 *Software Design and Development* (SCQF level 5) or any other suitable HN programming Unit.

## **Higher National Unit specification: General information (cont)**

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### **Core Skills**

Opportunities to develop aspects of Core Skills are highlighted in the Support Notes for this Unit specification.

There is no automatic certification of Core Skills or Core Skill components in this Unit.

### **Context for delivery**

If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed within the subject area of the Group Award to which it contributes.

### **Equality and inclusion**

This Unit specification has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence.

Further advice can be found on our website [www.sqa.org.uk/assessmentarrangements](http://www.sqa.org.uk/assessmentarrangements).

## Higher National Unit specification: Statement of standards

**Unit title:** Client Side Scripting for Web Applications (SCQF level 7)

Acceptable performance in this Unit will be the satisfactory achievement of the standards set out in this part of the Unit specification. All sections of the statement of standards are mandatory and cannot be altered without reference to SQA.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the Knowledge and/or Skills section must be taught and available for assessment. Learners should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

### Outcome 1

Describe client-side scripting features.

#### Knowledge and/or Skills

- ◆ Client-side scripting environment (browsers and editors)
- ◆ Characteristics of interpreted languages
- ◆ Differences between client-side and server-side scripting
- ◆ Document Object Model
- ◆ Location of client-side scripts

### Outcome 2

Implement programming elements associated with client-side scripting languages.

#### Knowledge and/or Skills

- ◆ Variables and data types
- ◆ Operators
- ◆ Arrays
- ◆ Control structures
- ◆ Functions
- ◆ Events and event handling
- ◆ Document Object Model

### Outcome 3

Implement and test a web application using client-side scripting elements.

#### Knowledge and/or Skills

- ◆ Testing
- ◆ Debugging
- ◆ Standardised practice
- ◆ Variables and data types
- ◆ Operators

## Higher National Unit specification: Statement of standards (cont)

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- ◆ Arrays
- ◆ Control structures
- ◆ Functions
- ◆ Events and event handling
- ◆ Document Object Model

### Evidence Requirements for this Unit

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills across all Outcomes.

The evidence for this Unit may be written or oral or a combination of these. Evidence may be captured, stored and presented in a range of media (including audio and video) and formats (analogue and digital). Particular consideration should be given to digital formats and the use of multimedia.

The Evidence Requirements for this Unit will take two forms:

- 1 Evidence of cognitive competence (Knowledge and Understanding) for Outcome 1.
- 1 Evidence of practical competence (practical abilities) for Outcomes 2 and 3.

For Outcome 1, candidates will be required to demonstrate that they will be able to describe:

- ◆ the environments used to create, test, and debug client-side scripts.
- ◆ the differences between interpreted languages and compiled languages stating the benefits and limitations of each.
- ◆ the main differences between client-side scripting and server-side scripting stating the benefits and limitations of each.
- ◆ the relationship between the Document Object Model and client-side scripts.
- ◆ the benefits and limitations of the following client-side script locations:
  - Embedded scripts, externally linked scripts and inline scripts.

Sampling is permissible when the evidence for cognitive competence is produced by a test of knowledge and understanding. The test may take any form (including oral) but must be supervised, unseen and timed. The contents of the test must sample broadly and proportionately from the contents of the knowledge domain (see above). Access to reference material is not appropriate for this type of assessment. If other methods of assessment are used, such as a report, open-book conditions must be applied. Refer to the assessment guidelines for further information.

## Higher National Unit specification: Statement of standards (cont)

### Unit title: Client Side Scripting for Web Applications (SCQF level 7)

For Outcome 2 candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by creating client-side scripts to perform various tasks. Collectively these tasks must demonstrate the use of:

- ◆ Variables:
  - Global variable and local variable
  - Different data types
- ◆ Operators:
  - Arithmetic operator, comparison operator, logical operator and assignment operator
- ◆ Arrays:
  - Use an array: one dimensional or two dimensional or associative
- ◆ Control Structures:
  - Selection — use an if statement or switch case statement
  - Iteration — use a loop
- ◆ Functions:
  - In-built and user-defined
  - Parameter passing
- ◆ Event handling:
  - Call an Event
- ◆ Document Object Model (DOM) manipulation:
  - Modify a document using the DOM

Outcome 2 will be assessed by a series of continuous open-book practical programming assignments.

For Outcome 3 candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by implementing and testing a web application to a given project brief using all of the programming elements associated with the Evidence Requirements as stated in Outcome 2.

The completed web application and supporting documentation must demonstrate:

- ◆ Testing
- ◆ Debugging
- ◆ Standardised practice

The assessment for Outcome 3 is open-book. Assessors should assure themselves of the authenticity of each individual candidate's submission.



## Higher National Unit Support Notes

**Unit title:** Client Side Scripting for Web Applications (SCQF level 7)

Unit Support Notes are offered as guidance and are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 80 hours.

### Guidance on the content and context for this Unit

This Unit has been designed to introduce the learners to the concept of programming using client-side scripting. The knowledge gained is to be used to enhance web applications by introducing dynamic features through the implementation of client-side scripts.

The Unit is intended for learners who already have some understanding of HTML as well as creating static web pages. It is an ideal introductory Unit to enable learners to prepare for more advanced Units which cover technical features such as server-side scripting and database integration.

This Unit consists of three Outcomes. Outcome 1 aims to introduce the learner to the various features, elements and tools that are associated with client-side scripting. This introductory Outcome aims at creating a foundation level of understanding of the basic characteristics, environments, and requirements needed to create and run client-side web scripts.

Outcome 2 aims to teach the learner the fundamentals of programming by introducing them to the various programming elements that constitute client-side scripts. This Outcome is used to provide the necessary programming skills which are required for Outcome 3.

Outcome 3 aims to test the knowledge and skills gained by the learners in the previous Outcome by implementing and testing a web application to a given project brief using the various programming elements associated with client-side scripts developed for Outcome 2.

#### Outcome 1

Learners should learn about the environment needed to create, test, debug, and access client-side scripts, such as browsers and text editors. They should also learn about various features and characteristics associated with interpreted languages as opposed to compiled languages in addition to learning about the main difference(s) between client-side and server-side scripts. The learners should also be introduced to the benefits and limitations of client-side script locations. They should also be introduced to the Document Object Model.

## Higher National Unit Support Notes (cont)

**Unit title:** Client Side Scripting for Web Applications (SCQF level 7)

### Outcome 2

Learners should learn about the various programming elements that constitute a client-side script. They should start by learning about the different data types available and how variables are defined and assigned.

They should also learn about:

- ◆ The concept and types of operators including arithmetic, comparison, logical and assignment
- ◆ Arrays: one dimensional, two dimensional and associative
- ◆ Programming constructs such as selection and iteration
- ◆ Modular programming using user-defined functions, parameter passing and the use of in-built functions
- ◆ Local and global variables
- ◆ Event handling using event handlers or event listeners
- ◆ The Document Object Model

The main aim of Outcome 2 is to provide learners with the necessary scripting/programming knowledge and skills to be implemented for the Outcome 3 project brief.

### Outcome 3

Learners should build on the knowledge and skills gained in Outcome 2 to implement and test a web application based on a project brief. The learners should be supplied with a scenario for a specific problem to which a solution will be created from scratch. Alternatively at the discretion of the centre, learners may base their assessment on other scenarios such as live client projects or industry style briefs. For their solutions, the learners will be expected to implement the knowledge and practical skills introduced in Outcome 2.

## Guidance on approaches to delivery of this Unit

This Unit should take approximately 80 hours to complete. It is recommended that Outcome 1 should be delivered first dedicating no more than 8 hours for both delivery and completion. Outcome 1 will be assessed in the form of written and/or oral recorded evidence testing the Knowledge and/or Skills of the learners who should be encouraged to use a wide range of reference materials to supplement their gained knowledge. Outcome 2 should be delivered next and it is recommended that approximately 36 hours should be dedicated to this Outcome. This Outcome could be introduced and assessed by a series of practical assignments as the knowledge and skills are taught. The remaining time should be dedicated to Outcome 3 which will be assessed by means of a small project the scenario of which is provided by the assessor or supplied by the learners at the discretion of the centre.

## Higher National Unit Support Notes (cont)

**Unit title:** Client Side Scripting for Web Applications (SCQF level 7)

### Guidance on approaches to assessment of this Unit

Evidence can be generated using different types of assessment. The following are suggestions only. There may be other methods that would be more suitable to candidates.

Centres are reminded that prior verification of centre-devised assessments would help to ensure that the national standard is being met. Where learners experience a range of assessment methods, this helps them to develop different skills that should be transferable to work or further and higher education.

Candidates are encouraged to use the Internet in any research but the evidence produced must be the candidate's own words. Assessors should assure themselves of the authenticity of the candidate's evidence.

Written and/or oral recorded, performance and product evidence is required which demonstrates that the candidate has achieved the requirements of all of the Outcomes to show that the candidate has appropriate knowledge and understanding of the content of this Unit.

Outcome 1 will be assessed in the form of written recorded evidence testing the Knowledge and/or Skills of the candidate.

Outcome 2 will be assessed by a series of continuous open-book practical assignments to test the candidate's ability to develop, write and implement suitable programming elements within client-side scripting. This evidence can be generated over a period of time into a learner portfolio.

Outcome 3 will be assessed by means of a small project in which candidates are required to demonstrate their programming skills by creating and testing dynamic web pages which integrate with client-side scripts. Evidence for testing and debugging could take the form of functionality tests recorded in a testing table along with screen dumps of a debugger window (browser or software) showing errors. Standardised practice could be evidenced via screen dumps of code; highlighting good practice such as code indentation and internal comments.

The Assessment Exemplar Pack for this Unit provides sample assessment materials including assessor checklists, practical tasks and an instrument of assessment for the knowledge. Centres wishing to develop their own assessments should refer to the Assessment Exemplar Pack to ensure a comparable standard.

### Opportunities for e-assessment

E-assessment may be appropriate for some assessments in this Unit. By e-assessment we mean assessment which is supported by Information and Communication Technology (ICT), such as e-testing or the use of e-portfolios or social software. Centres which wish to use e-assessment must ensure that the national standard is applied to all learner evidence and that conditions of assessment as specified in the Evidence Requirements are met, regardless of the mode of gathering evidence. The most up-to-date guidance on the use of e-assessment to support SQA's qualifications is available at [www.sqa.org.uk/e-assessment](http://www.sqa.org.uk/e-assessment).



## Higher National Unit Support Notes (cont)

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### **Opportunities for developing Core and other essential skills**

Although there is no automatic certification of Core Skills or Core Skill components in this Unit, there are opportunities to develop all or elements of the Core Skills of *Information and Communication Technology (ICT)* and *Problem Solving* at SCQF level 6.

## History of changes to Unit

Version	Description of change	Date

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## General information for learners

### Unit title: Client Side Scripting for Web Applications (SCQF level 7)

This section will help you decide whether this is the Unit for you by explaining what the Unit is about, what you should know or be able to do before you start, what you will need to do during the Unit and opportunities for further learning and employment.

This Unit is designed to enable you to understand fundamental concepts of programming using scripting languages. It provides you with the necessary knowledge and experience to enable the creation and enhancement of web pages using client-side scripting.

On completion of this Unit you should be able to:

- 1 Describe client-side scripting features.
- 2 Implement programming elements associated with client-side scripting languages.
- 3 Implement and test a web application using client-side scripting elements.

Outcome 1 will introduce you to the generic features associated with client-side scripting dealing specifically with scripting environments (browsers and text editors), characteristics of interpreted languages, client-side versus server-side scripting and the methods adopted for integrating client-side scripts within web pages. You will be assessed using written recorded evidence to test your Knowledge and/or Skills gained.

In Outcome 2, you will study and use the various programming elements associated with client-side scripts to build your programming capabilities. You will become familiar with concepts such as data types, arithmetic, comparison, assignment and logical operators, arrays, control structures, modular programming (functions), in-built functions, global and local variables, events and event handling, and the Document Object Model. You will be assessed with a series of continuous practical exercises as you finish learning the individual programming elements to test your knowledge and skills.

In Outcome 3 you will apply the knowledge and practical skills gained in Outcome 2 by implementing and testing client-side scripts used in the creation of a web application for a given project brief.

Although there is no automatic certification of Core Skills or Core Skill components in this Unit, there are opportunities to develop all or elements of the Core Skills of *Information and Communication Technology (ICT)* and *Problem Solving* at SCQF level 6.