



Higher National Unit specification

General information for centres

Unit title: Client Side Scripting for Web Applications

Unit code: F1VW 34

Unit purpose: This Unit is designed to introduce candidates to the fundamental concepts of programming using scripting languages. The Unit involves combining both scripts and HTML (or XHTML) to enable the creation of dynamic client based web pages. It is intended for candidates who already have some understanding of HTML and/or XHTML and the fundamental requirements of creating static web pages.

On completion of the Unit the candidate should be able to:

- 1 Describe client-side scripting features.
- 2 Demonstrate the use of programming elements associated with client-side scripting languages.
- 3 Use client-side scripting elements to implement a web application.

Credit points and level: 2 HN credits at SCQF level 7: (8 SCQF credit points at SCQF level 7*)

**SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.*

Recommended prior knowledge and skills: Access to this Unit will be at the discretion of the centre. However, it is recommended that candidates have prior basic knowledge in developing simple web pages using HTML (Hyper Text Mark-up Language) and/or XHTML (Extensible Hypertext Mark-up Language) as well as elementary knowledge of computer programming using high level languages. This may be demonstrated by the possession of any relevant NC Unit, such as, A99A 99 *Computing: Programming in a High-level language: Fundamentals (SCQF 4)* or other suitable HN programming Units.

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

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.

The Assessment Support Pack (ASP) for this Unit provides assessment and marking guidelines that exemplify the national standard for achievement. It is a valid, reliable and practicable assessment. Centres wishing to develop their own assessments should refer to the ASP to ensure a comparable

standard. A list of existing ASPs is available to download from SQA's website (<http://www.sqa.org.uk/sqa/46233.2769.html>).

Assessment: Evidence is required that candidates have achieved all Outcomes.

Evidence is required to show that the candidate has achieved all outcomes and Knowledge and/or Skills.

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

Outcome 3 will be assessed by means of a small project in which candidates are required to demonstrate their programming skills by creating a set of dynamic web pages. Client-side scripts must be created and integrated within a web application using a number of suitable methods such as external files, event handlers, between tags, body of URL, and in style sheets.

Assessors should ensure themselves of the authenticity of the candidate's evidence.

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.

Higher National Unit specification: statement of standards

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The sections of the Unit stating the Outcomes, Knowledge and/or Skills, and Evidence Requirements are mandatory.

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. Candidates 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
- ◆ Types of scripting languages
- ◆ Methods used to implement client-side scripts within web pages

Evidence Requirements

Evidence of all the Knowledge and/or Skills in this Outcome will be assessed by written and/or oral recorded evidence testing the Knowledge and/or Skills using a representative sample covering all the Knowledge and/or Skills bulleted points.

Candidates will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can:

- ◆ Client-side scripting environment (browsers and editors)
 - create, test, run, and access client-side scripts
 - browsers, editors, graphic packages
- ◆ Characteristics of interpreted languages
 - the features and characteristics associated with interpreted languages compared to compiled languages will include major advantages and disadvantages
- ◆ Differences between client-side and server-side scripting
 - environment under which each type is used
 - tools needed to produce and run the scripts
 - on-line database accessibility
- ◆ Types of scripting languages
 - the different types of scripting languages currently available highlighting their major advantages, drawbacks, uses
- ◆ Methods used to implement client-side scripts within web pages
 - embedded coding
 - externally stored code

Higher National Unit specification: statement of standards (cont)

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Assessment must be undertaken in supervised conditions and is open-book. A candidate must complete this assessment within one hour. Candidates can bring to the assessment event any notes, textbooks, handouts or other material.

Assessment Guidelines

Where re-assessment is required it should contain a different sample from the range of mandatory content.

Outcome 2

Demonstrate the use of programming elements associated with client-side scripting languages

Knowledge and/or Skills

- ◆ Primitive data types and variables
- ◆ Operators
- ◆ Arrays
- ◆ Control structures
- ◆ Functions
- ◆ Events and event handlers
- ◆ Introduction to object data types and the browser specific object model components
- ◆ Dynamic HTML (DHTML) features

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills in the use of programming elements within client-side scripts. This will be achieved by showing that they can demonstrate the use of:

- ◆ Primitive data types and variables
 - numerical and text primitive data types
 - variable definition, declaration and assignment
 - local and global variables
- ◆ Operators
 - a minimum of two arithmetic operators such as +, -, *, /, and modulus
 - a minimum of two comparison operators such as equal, not equal, greater than, greater than or equal to, less than, less than or equal to
 - if appropriate then logical operators such AND, OR, NOT
- ◆ Arrays such as one-dimensional and two-dimensional arrays
- ◆ Control Structures
 - iterations as appropriate such as for, do and while loops
 - selection using appropriate branching construct(s)
- ◆ Functions
 - parameter passing
 - user-defined functions
 - language specific built-in functions

Higher National Unit specification: statement of standards (cont)

Unit title: Client Side Scripting for Web Applications

- ◆ Event Handlers
 - mouse click
 - mouse over
- ◆ Introduction to object data types and the browser specific object model components
 - object concepts object such as attributes and operations
 - use of browser specific objects in client-based scripts
- ◆ Dynamic HTML (DHTML) features
 - data can be initialisation and manipulation via user interaction
 - dynamically change web pages using scripts, eg changing the size of text as the mouse pointer rolls over it

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

Outcome 3

Use client-side scripting elements to implement a web application

Knowledge and/or Skills

- ◆ Declare, assign, and use data types
- ◆ Implement data input through user interaction
- ◆ Use single or higher-dimensional arrays
- ◆ Implement loops and iterative control structures
- ◆ Use modular programming methods with user-defined functions
- ◆ Use language specific built-in functions
- ◆ Use browser objects
- ◆ Implement different types of events and event handlers
- ◆ Use and validate form inputs
- ◆ Use properties associated with specific object(s) to control timed events on the implemented web pages

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills in implementing a web application to a given scenario using the programming elements associated with client-side scripts developed in Outcome 2. The web application must be further enhanced by including various dynamic features, using form inputs validation, coding to meet organisational standards, testing, debugging and re-writing as necessary.

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

Administrative Information

Unit code:	F1VW 34
Unit title:	Client Side Scripting for Web Applications
Superclass category:	CE
Original date of publication:	August 2007
Version:	02 (September 2013)

History of changes:

Version	Description of change	Date
02	Evidence requirements for Outcome 1 changed from closed-book to open-book. Typo removed from Outcome 2 Evidence Requirements.	13/09/13

Source: SQA

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Higher National Unit specification: support notes

Unit title: Client Side Scripting for Web Applications

This part of the Unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

Guidance on the content and context for this Unit

This Unit has been designed to introduce the candidates 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 candidates who already have some understanding of HTML and/or XHTML as well as the fundamental requirements needed to create static web pages. It is an ideal introductory Unit to enable candidates to undertake other Units with advanced features such as server-side scripting as well as advanced web development.

A number of current scripting languages can be used in the delivery of this Unit. However, Centres may opt to use any other suitable client-side language that fits with the local needs.

This Unit consists of three Outcomes which must be assessed separately. Outcome 1 aims to introduce the candidates to the various features, elements and tools that can be 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 candidates 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 candidates in the previous Outcome by implementing a web application to a given scenario using the various programming elements associated with client-side scripts.

Outcome 1

Candidates should learn about the environment needed to create, test, run, and access client-side scripts, such as browsers, editors, graphic packages and/or as well as other utilities and tools that enable these tasks. 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 web-side scripts. The candidates should also learn about the wide range of scripting languages available and their major advantages and drawbacks. The candidates should also be introduced to the methods by which client-side scripts can be integrated within web applications and the means of accessing such scripts.

Outcome 2

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

Higher National Unit specification: support notes (cont)

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They should also learn about:

- ◆ the concept and types of operators including mathematical, comparison, and logical as well as the order of precedence of these operators
- ◆ data storage using single and/or multidimensional arrays
- ◆ programming constructs such as selection and iteration
- ◆ modular programming using user-defined functions, parameter passing and the use of built-in functions
- ◆ local and global variables
- ◆ events and event handlers
- ◆ objects and the use of object methods and properties
- ◆ data initialisation and manipulation via user interaction

The main aim of Outcome 2 is to provide candidates with the necessary scripting programming knowledge and skills to be used and extended in Outcome 3.

Outcome 3

Candidates should build on the knowledge and skills gained in Outcome 2 to implement a web application with added dynamic features. The candidates should be supplied with a given scenario of a specific problem for which a solution will be created from scratch. Alternatively at the discretion of the centre, candidates may base their assessment on other scenarios based on personal experience and/or preference or drawn from their workplace. On the other hand, it is also feasible for centres to supply their candidates with pre-written web documents to which client-side scripts will be added by the candidates to enhance interactivity, performance and functionality.

In their solutions, the candidates will be expected to use the knowledge and skills introduced in Outcome 2.

Guidance on the delivery and assessment 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 candidates 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 candidates at the discretion of the centre.

Opportunities for developing Core 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 Technology* and *Problem Solving* at SCQF level 6.

Higher National Unit specification: support notes (cont)

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Open learning

If this Unit is delivered by open or distance learning methods, additional planning and resources may be required for candidate support, assessment and quality assurance. A combination of new and traditional authentication tools may have to be devised for assessment and re-assessment purposes. For further information and advice, please see Assessment and Quality Assurance for Open and Distance Learning (SQA, February 2001 – publication code A1030).

Candidates with disabilities and/or additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering alternative Outcomes for Units. Further advice can be found in the SQA document *Guidance on Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs* (www.sqa.org.uk).

General information for candidates

Unit title: Client Side Scripting for Web Applications

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 Demonstrate the use of programming elements associated with client-side scripting languages
- 3 Use client-side scripting elements to implement a web application

Outcome 1 will introduce you to the generic features associated with client-side scripting dealing specifically with scripting environments (browsers and editors), characteristics of interpreted languages, client-side vs server-side scripting, common types of scripting languages, and the methods adopted in 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 primitive data types, mathematical, comparison, and logical operators, arrays, control structures, modular programming (functions), built-in functions, global and local variables, events and event handlers, objects together with their methods and properties, and Dynamic HTML. You will be assessed with either 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 skills you gained in Outcome 2 by implementing a web solution using client-side scripts for a given scenario.