SQA Advanced Unit Specification

General information for centres

Unit title: Web Development: Advanced Web Scripting Concepts (SCQF level 8)

Unit code: HT92 48

Superclass:	CB
Publication date:	August 2017
Source:	Scottish Qualifications Authority
Version:	01

Unit purpose

This unit is designed to develop knowledge of a range of concepts, principles and techniques of web scripting which are beyond the introductory level. Learners will further develop their problem solving and client-side and server-side web scripting skills. Learners will then be required to demonstrate their proficiency in these skills through the creation of dynamic web pages as solutions to given problems.

This unit will be suitable for learners who already have a broad understanding of the concepts, principles, and techniques of client-side and server-side web scripting.

Outcomes

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

1 describe advanced client-side and server-side scripting features
2 design a web application using advanced client-side and server-side scripting features
3 implement a web application using advanced client-side and server-side scripting features

Credit points and level

1 SQA credit at SCQF level 8: (8 SCQF credit points at SCQF level 8)

Recommended entry to the unit

Access to this unit will be at the discretion of the centre. However, it is recommended that learners should have a broad understanding of the concepts, principles, and techniques of client-side and server-side scripting in a web development context. This may be demonstrated by possession of the following SQA Advanced Unit:

HP2T 48   *Web Development: Dynamically Generated Content*

Alternatively, learners may have considerable practical work experience and a portfolio of programs which demonstrate their competence in object oriented software development.

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**.

SQA Advanced Unit Specification: Statement of standards

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(SCQF level 8)

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 advanced client-side and server-side scripting features.

Knowledge and/or skills

- ♦ DOM programming
- ♦ AJAX
- ♦ Design patterns
- ♦ Templating systems
- ♦ Security in relation to web applications
- ♦ Deployment, including coping with scale

Outcome 2

Design a web application using advanced client-side and server-side scripting features.

Knowledge and/or skills

- ♦ Site structure
- ♦ Page templates and layouts
- ♦ Design patterns

Outcome 3

Implement a web application using advanced client-side and server-side scripting features.

Knowledge and/or skills

- ♦ Implementation of DOM programming
- ♦ Implementation of AJAX
- ♦ Implementation of design patterns
- ♦ Implementation of a templating system
- ♦ Implementation of security in relation to web applications
- ♦ Deployment of a web application

Evidence requirements for this unit

Learners will need to provide evidence to demonstrate their knowledge and/or skills across all the outcomes by showing that they can describe advanced client-side and server-side scripting features, plan and design a web application using advanced client-side and server-side scripting features, and apply them appropriately to a design.

Outcome 1 is knowledge based and requires that learners demonstrate their cognitive competence.

Evidence of this may be sampled across the knowledge domain which must encompass all of the knowledge statements in Outcome 1. If a traditional test is used to assess the learner's knowledge and understanding, this test should be timed and completed in a single assessment occasion ('sitting') and an appropriate pass mark should be set. Where reassessment is required, it should contain a different sample from that previously used.

Outcomes 2 and 3

A learner's response can be judged to be satisfactory where the evidence produced shows the learner has successfully produced a design document for a web application using advanced client-side and server-side scripting features. The design document should include:

♦   A description of the site structure
♦   Page layouts that demonstrate the use of:
    —   DOM programming
    —   AJAX
    —   Design patterns
    —   Page templates

Learners will also need to demonstrate that they have successfully applied appropriate advanced client-side and server-side scripting features to implement a web application, including:

♦   Implement DOM programming
♦   Implement AJAX
♦   Implement design patterns
♦   Implement a templating system
♦   Implement security in relation to web applications
♦   Deploy a web application

Assessment of these outcomes should be conducted under open-book conditions. Assessors must assure themselves of the authenticity of each learner's submission.

SQA Advanced Unit Support Notes

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                    (SCQF level 8)

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 40 hours.

Guidance on the content and context for this unit

The purpose of this unit is to introduce the learner to a number of advanced client-side and server-side scripting concepts that are beyond the introductory level. The learner should already be familiar with the following scripting concepts:

♦ Operators
♦ Arrays
♦ Control structures
♦ Functions
♦ Events and event handlers
♦ Pass and obtain data from forms
♦ Connect to a data source
♦ Implement SQL queries
♦ Interrogate a database
♦ Implement session management

Learners will acquire knowledge of advanced client-side and server-side scripting concepts and principles. Learners will then be required to implement advanced client-side and server-side scripting skills through the creation of web application solutions to problems.

This unit forms part of the SQA Advanced Diploma in Computing: Software Development and should be delivered within the context of the group award. It would be suitable for learners who are proposing to follow a career in software development. It is not suitable as a stand-alone unit, but could be taken after successful completion of HP2T 48 *Web Development: Dynamically Generated Content*, or fit into the second year of the SQA Advanced Diploma in Computing: Software Development.

Guidance on approaches to delivery of this unit

Outcome 1 introduces learners to the following advanced client-side and server-side concepts:

♦ DOM programming
♦ AJAX
♦ Design patterns
♦ Templating systems
♦ Security in relation to web applications
♦ Deployment, including coping with scale

Outcome 2 requires the learner to plan and design a web application that demonstrates the use of advanced client-side and server-side scripting features.

Outcome 3 requires the learner to implement all of the concepts taught in Outcome 1.

Outcome 1 could be treated as a theoretical outcome and taught first, but would probably be best taught together with Outcomes 2 and 3, thereby intertwining theory and practice as much as possible.

The implementation languages chosen are not specified. At the time of writing, the most appropriate languages to use would be JavaScript for client-side scripting and PHP for server-side scripting. Both of these languages are widely used in the industry.

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 learners.

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.

The timing of the assessment for Outcome 1 should be at the discretion of the centre assessor. It is recommended that this is assessed towards the end of the unit, since it is intended that the learner should have practical experience of the concepts being assessed. It is recommended that Outcome 1 be assessed by a set of 20 multiple-choice questions. The sample should cover:

- ♦ DOM programming
- ♦ AJAX
- ♦ Design patterns
- ♦ Templating systems
- ♦ Security in relation to web applications
- ♦ Deployment, including coping with scale

Learners should complete this assessment within one hour and must answer at least 60% of the questions correctly.

Assessment must be undertaken in supervised conditions and is closed book. Learners may not bring to the assessment event any notes, textbooks, handouts or other material (calculators are not allowed). The questions presented must change on **each** assessment occasion.

If a centre is presenting this assessment on-line the following assessment methods, where appropriate, may be selected:

- ♦ Multiple-choice
- ♦ Drag and drop
- ♦ Multiple response
- ♦ Mix and match
- ♦ A combination of the above

It is recommended that Outcomes 2 and 3 be assessed holistically using a single case study.

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**.

Opportunities for developing Core and other essential skills

There may be opportunities to gather evidence towards Core Skills in this unit, although there is no automatic certification of Core Skills or Core Skills components.

Learners develop the *Problem Solving* Core Skill at SCQF level 6 through identifying how to implement the software solution based on a design which does not provide detailed instructions on how to program a solution. The learners could be required to write a short report detailing their problem solving process, ie how they identified the best programming structures to use for the major program functionality, in order to fulfil this requirement.

History of changes

Version	Description of change	Date

For further information, please call SQA's Customer Contact Centre on 44 (0) 141 500 5030 or 0345 279 1000. Alternatively, complete our Centre Feedback Form.

General information for learners

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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 cover some of the more advanced concepts and skills required for a career in software development, and in particular the development of dynamically generated web applications. You will acquire knowledge of a range of more advanced concepts, principles, and techniques of client-side and server-side scripting.

It is a non-introductory unit and assumes prior knowledge and proficiency in the fundamental concepts, principles, and techniques of client-side and server-side scripting. The SQA Advanced Unit *Web Development: Dynamically Generated Content* is a recommended pre-requisite for this unit.

You will learn the use of the appropriate client-side and server-side programming languages, and in particular the following concepts and techniques:

♦ DOM programming
♦ AJAX
♦ Design patterns
♦ Templating systems
♦ Security in relation to web applications
♦ Deployment, including coping with scale

You will design and implement a software solution based on a given problem. Your understanding and grasp of client-side and server-side scripting will be reinforced throughout with practical exercises.

You may be assessed by a test for the knowledge in Outcome 1 and a case study for Outcomes 2 and 3.

You will have the opportunity to develop the *Problem Solving* Core Skill at SCQF level 6 through identifying how to implement the software solution based on a design which does not provide detailed instructions on how to program a solution.