Higher National Unit specification

General information

Unit title: Web Development: Tools and Technologies (SCQF level 8)

Unit code: HF3J 35

Superclass: CB

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Version: 02

Unit purpose

This Unit is designed to enable learners to develop a broad knowledge of the current tools and technologies available to streamline the web development process. Learners will develop skills to help them select appropriate and useful new tools and technologies from the vast amount continually emerging. Learners will then be required to demonstrate their proficiency in selecting tools and technologies and using them in the web development process.

The Unit is suitable for a wide range of learners with a personal or vocational interest in website development.

The Unit will cover a variety of key areas including trends in the use of front-end frameworks, libraries, extensions and plug-ins, work flow and task runner tools, benefits in using collaboration tools, tools that keep code maintainable and future-proof as well as synchronised testing and inspection.

On completion of the Unit, learners will have a much greater understanding of the available current tools and technologies available to improve productivity in the web development process and also able to implement a selection of appropriate new tools and technologies.

Higher National Unit specification: General information (cont)

Unit title: Web Development: Tools and Technologies (SCQF level 8)

Outcomes

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

1 Describe current tools and technologies available to streamline the web development process.
2 Plan tools and technologies required to efficiently develop a web solution from a set of given requirements.
3 Develop a web solution using a suitable workflow and set of tools and technologies.
4 Evaluate web development workflow and tools and technologies.

Credit points and level

2 Higher National Unit credits at SCQF level 8: (16 SCQF credit points at SCQF level)

Recommended entry to the Unit

While access to this Unit will be at the discretion of the centre, learners would benefit from the knowledge and fundamental skills of web design and development.

Core Skills

Achievement of this Unit gives automatic certification of the following:

Complete Core Skill   Problem Solving at SCQF level 6

Core Skill component   None

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

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**.

Higher National Unit specification: Statement of standards

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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 current tools and technologies available to streamline the web development process.

Knowledge and/or Skills

- Current tools and technologies available to aid the web development process
- Reliable sources and suitability of current tools and technologies
- Trends in the use of front-end frameworks
- Expanding amount of libraries, extensions and plug-ins
- Work flow and task runner tools for automating tasks
- Benefits of the use of collaboration tools
- Tools that keep code maintainable, future-proof and reduce the amount of code
- Synchronised web development testing and inspection

Outcome 2

Plan tools and technologies required to efficiently develop a web solution from a set of given requirements.

Knowledge and/or Skills

- Efficient workflow
- Effective solution
- Selection of appropriate tools and technologies
- Justification of the selected tools and technologies

Outcome 3

Develop a web solution using a suitable workflow and set of tools and technologies.

Knowledge and/or Skills

- Setup
- Design
- Development
- Implementation

Higher National Unit specification: Statement of standards (cont)

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Outcome 4

Evaluate web development workflow and tools and technologies.

Knowledge and/or Skills

♦ Efficiency of the web development process
♦ Effectiveness of selected tools and technologies
♦ Ease of use of selected tools and technologies

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.
2   Evidence of practical competence (practical abilities) for Outcomes 2, 3 and 4.

The evidence of cognitive competence for Outcome 1 will be:

A description of the current tools and technologies available to streamline the web development process to include all of the following:

♦ Identification of current tools and technologies available to aid the web development process
♦ Reliable sources and suitability of current tools and technologies
♦ Trends in the use of front-end frameworks
♦ Expanding amount of libraries, extensions and plug-ins
♦ Work flow and task runner tools for automating tasks
♦ Benefits of the use of collaboration tools
♦ Tools that keep code maintainable, future-proof and reduce the amount of code
♦ Synchronised web development testing and inspection

Higher National Unit specification: Statement of standards (cont)

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The evidence of practical competence for Outcomes 2, 3 and 4:

♦ Production of a plan detailing and justifying a set of tools and technologies required to efficiently develop a web solution for a set of given requirements
♦ Setup of selected development tools and technologies
♦ Production of design documentation for a web solution based on a set of given requirements
♦ Development of a web solution implementing the selected tools and technologies
♦ Evaluation of the effectiveness and ease of use of the selected tools and techniques and efficiency of the web development process

Evidence of practical competence may be produced over an extended period of time. Evidence may be wholly or partly produced under controlled conditions. When evidence is produced in uncontrolled or loosely controlled conditions it must be authenticated. The *Guidelines on Approaches to Assessment* (see the Support Notes section of this specification) *provides* further advice on methods of authentication.

The *Guidelines on Approaches to Assessment* (see the Support Notes section of this specification) provides specific examples of instruments of assessment.

Higher National Unit Support Notes

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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

The Unit is intended to provide learners with the knowledge and skills required to develop web sites using current and useful web development workflow tools and technologies. Working on the web means that things change really quickly and there are continually new tools and technologies emerging to help streamline the web development process.

Outcome 1 is designed to help learners distinguish what tools and technologies are useful and what are not as it is so easy to become overwhelmed with the amount of available new tools and technologies. Learners will be encouraged to investigate reliable sources for news and trends in front-end web development. The tutor should discuss the main types of tools and technologies available and let the learner explore to find balanced and dependable opinions on what tools would be of value to use or learn.

Learners should be encouraged to subscribe to weekly newsletters that give a high level overview of what is new. As there are so many blog posts and articles published every day, it is not possible to read them all so learners should be encouraged to have a strategy to keep up to date. This could include following respected people on social media, creating a list of the best sources, eg podcasts, blogs, weekly news and check them out regularly. Twitter can be a great place to find people who are in-the-know. This is one useful current Twitter feed https://twitter.com/frontendrescue/lists/cool-people/members. Learners should also be made aware of the benefits of attending conferences.

At the time of writing some current tools and technologies that could be discussed and researched are:

♦ Front-end frameworks - Bootstrap, Foundation, Susy and Angular JS
♦ Libraries — React.js or ReactJS, JQuery
♦ Workflow Tools:
   — Scaffolding Tool — Yo
   — Task Runners/Build Tool - GRUNT and GULP
   — Package Manager — Bower and npm
♦ Collaboration tools — GitHub Trello, Conceptboard, Realtimeboard
♦ CSS Pre-processor and CSS Post processors — Sass, Less, PostCSS
♦ Synchronised web development testing and inspection — Browsersync and Ghostlab

Higher National Unit Support Notes (cont)

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Outcomes 2 and 3 are designed to allow the learner to think about how they could use a variety of the tools and technologies that they have been researching in their web development work. Once they have identified a selection of tools and technologies that would be beneficial to productivity the learner should have the opportunity to implement or apply them to a web project.

Outcome 4 is designed for learner reflection on the benefits of using the tools and technologies that they implemented during a practical project.

It may be beneficial to deliver this Unit alongside another web development Unit where the learner is carrying out a web project.

At the time of writing this Unit relates to Tech Partnership IT User Skills Standards (National Occupational Standards), particularly ESKITU072 Digital content, ESKITU033 Collaborative tools, ESKITU063 Digital applications and ESKITU013 Develop digital information strategies

Guidance on approaches to delivery of this Unit

It is recommended that delivery of this Unit follows the sequence of Outcomes. A reasonable amount of time should be spent on Outcome 1. The tutor should discuss the ever-changing and incredible amount of tools and technologies available to web developers and emphasise the importance of being able to distinguish between those tools and technologies that will be useful and improve productivity and those that will not. It would then be a good idea to emphasise the importance of finding reliable sources of information, how to go about it and how to keep up-to-date without out being overwhelmed. The learners should be encouraged either as individuals or in groups to research the current tools and technologies being used by the professionals in the web development industry. The research should conclude in a log of useful, current, reliable sources which could include blogs, twitter feeds, magazines. At this stage Outcome 1 assessment could take place.

Learners should have the opportunity to try out a selection of appropriate tools and techniques to see what would be most useful. Some tools and techniques will take longer than others for the learner to be able to use to a standard that could be used productively. At this stage the tutor could demonstrate how to use some tools and techniques. Online videos can be brilliant for this purpose. Once the learner has a good grasp of the tools, they can be given a set of requirements for a website and make a plan of the tools and techniques that they intend to use to help in the web development process. Being able to select and implement 4 new tools or technologies would be sufficient to show that the learner is competent in developing a web solution using a suitable workflow and set of tools and technologies. If the learner is undertaking another web development Unit it may be practical and useful to combine the assessment.

Once the learner has completed the assessment for Outcomes 2 and 3, they can immediately proceed to Outcome 4 assessment. This is an evaluation on how the project went, using a set of new tools and technologies.

Higher National Unit Support Notes (cont)

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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 candidates experience a range of assessment methods, this helps them to develop different skills that should be transferable to work or further and higher education.

Assessment could be carried out using:

♦ An assignment that covers the knowledge and understanding for Outcome 1
♦ A practical task and end evaluation that cover the practical competence and understanding for Outcomes 2−4

The assignment would require the candidate to research and produce a report, log or presentation which demonstrates that the candidate is able to describe current tools and technologies available to streamline the web development process which includes:

♦ Reliable sources and suitability of current tools and technologies
♦ Trends and current options in the use of front-end Frameworks
♦ Expanding amount of libraries, extensions and plug-ins
♦ Work flow and task runner tools for automating tasks
♦ Benefits of the use of collaboration tools
♦ Tools that keep code maintainable, future-proof and reduce the amount of code
♦ Synchronised web development testing and inspection

The evidence produced should be written in the candidates' own words. References to all websites and resources used for research should be included in the evidence.

The practical task could take place over an extended period of time. In this scenario the candidate would be given a set of website requirements and a set of tasks that require them to select and justify appropriate tools and technologies to use while designing and developing a web solution effectively and efficiently.

If the candidate was undertaking another Unit in web development, it may be suitable to integrate the assessments. The given requirements need to be sufficient in that they allow the candidate to cover all practical Evidence Requirements for Outcomes 2 and 3.

After development the candidate would reflect on how effective the new tools and technologies were during the web development process.

The assessments will be open-book and carried out under both supervised and unsupervised conditions. It is important that steps are taken to ensure the authenticity of the candidates' work. This could be done by questioning how certain aspects of the project have been achieved or the learner asked to demonstrate how something has been achieved.

Higher National Unit Support Notes (cont)

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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

The Unit helps learners develop the Core Skill Components in *Communication* by presenting some evidence in report or presentation format. The Unit also gives learners the opportunity to enhance their *Information and Communication Technology (ICT)* and *Problem Solving* skills, whilst installing software. There are opportunities to develop broader skills in employability, enterprise and citizenship if the project brief used is based on a real client, for example a charity, a public service organisation or a business project.

This Unit has the Core Skill of Problem Solving embedded in it, so when learners achieve this Unit their Core Skills profile will be updated to show that they have achieved Problem Solving at SCQF level 6.

History of changes to Unit

Version	Description of change	Date
02	Core Skill Problem Solving at SCQF level 6 embedded.	19/08/2016

Additional copies of this Unit specification can be purchased from the Scottish Qualifications Authority. Please contact the Business Development and Customer Support team, telephone 0303 333 0330.

General information for learners

Unit title: Web Development: Tools and Technologies (SCQF level 8)

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 covers the emerging and current tools and technologies available to streamline the web development process. It is easy to become overwhelmed with the amount of available new tools and technologies so you will be encouraged to investigate reliable sources for news and trends in front-end web development.

The types of tools and techniques will include the use of front-end frameworks, libraries, extensions and plug-ins, work flow and task runner tools, collaboration tools, tools that keep code maintainable and future-proof as well as synchronised testing and inspection.

You will develop skills in using a selection of appropriate and useful tools and technologies and have the opportunity to apply/use these tools and technologies whilst developing a web solution.

There will probably be two assessments that you will need to complete during this Unit.

One will be a theory based assessment where you will be have to carry out research on emerging and current web development tools and technologies. From your research you will need to produce a report, log or presentation.

The other assessment will be a practical task where you will be given set of website requirements and from these requirements select a set of new tools and technologies that will be beneficial to you while carrying out a web development project. You will design and develop the web solution using a set of selected tools and techniques. You will need to evaluate your selection of web development tools and techniques and describe their effectiveness and ease of use.

The Unit will help you develop the Core Skill Components in *Communication* by presenting some evidence in report or presentation format. The Unit will also give you the opportunity to enhance the *Information and Communication Technology (ICT)* and *Problem Solving* skills, whilst installing software. There are opportunities to develop broader skills in employability, enterprise and citizenship if the project brief used is based on a real client, for example a charity, a public service organisation or a business project.

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