Unit 20: Web Fundamentals

Unit code: R/601/3512

QCF Level 2: BTEC Specialist

Credit value: 7

Guided learning hours: 60

Aim and purpose

This unit provides knowledge of web architecture, components and technologies. It also covers the implementation of website elements.

Unit introduction

The world-wide web has given rise to a new medium of communication. Websites can allow us to 'walk into' a world with very few boundaries. We can find MP3 files and download them with ease. Our digital images can be sent to relatives overseas in seconds. We can go shopping without leaving our homes and source the very best prices with the click of a mouse button.

Essential to developing the worldwide web are the people who design effective documents that can be 'read' by a web browser. Web designers have the fascinating task of taking text, images, video and other resources and crafting them into high quality documents for broadcasting across the world via the internet. Their brief is to produce attractive and informative sites that are accessible to everyone.

In this unit learners see the potential of the web and will develop a skill set which will be highly valued by industry and commerce as well as being a useful personal skill for leisure pursuits. Web design is a skill that is becoming more and more popular as the worldwide web expands and as companies see the advantage of using browser technology for their company intranets. The unit provides a firm grounding in the concepts of web design which will help learners to progress to employment or to another educational course and to become valued employees with the key skills needed in their chosen employment.

Learning outcomes and assessment criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

On completion of this unit a learner should:

Learning outcomes	Assessment criteria	
1 Know web architecture and components	1.1	list the hardware and software components which enable the internet and web
	1.2	state the role of the TCP/IP protocol
	1.3	state the role of internet service providers, web hosting services and domain name registrars
	1.4	identify available types of web functionality
2 Know about the technologies used to build and operate websites	2.1	state the purpose of markup languages and list commonly used examples
	2.2	identify the roles of: • web runtime environments • web application programming languages • databases • in building websites and web applications
	2.3	identify typical product stack combinations that can be used for web development
3 Implement specified components of a website	3.1	state the components required to produce a website
	3.2	design specified components of a website
	3.3	develop specified components of a website
	3.4	test specified components of a website

Unit content

1 Know web architecture and components

Components: hardware eg web, mail and proxy servers; routers; software eg browser, email

Protocols: role of TCP/IP eg function of layers (data flow or network access, internet, transport, application)

Web architecture: Internet Service Providers (ISP); web hosting services; domain structure; domain name registrars; worldwide web

Web functionality: Web 2.0; blogs; online applications

2 Know about the technologies used to build and operate websites

Technologies: markup languages eg HTML, TeX, XML; web languages eg Expression Web, Dreamweaver, Flash; scripting languages eg JavaScript, VBScript; runtime environments eg Windows, MAC; databases; product stack combinations eg Oracle, IBM Websphere

3 Implement specified components of a website

Design: tools eg storyboards, sample pages; style eg layout, corporate image, use of logos

Components: frames, templates, action buttons; hyperlinks, visited hyperlinks; hotspots; download speeds eg affected by browser, memory size of pages; interactive features eg email links, registration login

Develop: format and edit common web functions eg bookmarks, hyperlinks, graphics, fonts, text, formatting, background colours, images; simple HTML eg editor programs, file extensions; HTML tags eg <html>, <p>, <body>, <center>, closing tags; editing tools, formatting tools; file management eg naming files, folder structures, moving files, deleting files

Combining information: different sources eg scanner, digital camera, application packages, original artwork, clip art

Testing: image resolution; colours; links; appropriateness of content; text; formatting

Essential guidance for tutors

Delivery

The fun element of this unit will be the design and development of websites for learning outcome 3 and tutors may prefer to start here to engage learners with the unit. There is scope in this unit for learners to be creative and this should be encouraged.

It will be helpful if learners review existing websites to aid their designs and implementations. Design documentation could include the use of pictorial representations illustrating the overall website design, individual page layouts and notes on navigation. Issues such as the choice of font and layout are important and learners should be encouraged, through the use of appropriate support materials, to understand the aesthetic and image considerations of their work.

The practical workshop activity should not be wholly focused on the production of the website that will be submitted for assessment. Small developmental activities that cover the content and ensure learners are confident on a wide variety of techniques are recommended - these might involve other technologies such as digital cameras, creating thumbnails, animated gifs, sound recording, etc. The content requires that learners edit HTML, and so some aspects of HTML will need formal teaching - learners could be taught with examples of lines and gain skills developed through small practical exercises that build confidence in a number of specific techniques. Some time should be spent on testing and user feedback to inform development.

Much of the content in learning outcomes 1 and 2 will arise during the practical work, eg use of web and scripting languages, but formal teaching to ensure coverage will probably be required. If learners have undertaken any networking units they will be familiar with the hardware.

Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments. The outline learning plan demonstrates one way in planning the delivery and assessment of this unit.

Topic and suggested assignments/activities and/assessment
Introduction to the unit
Web architecture and components • Revision of hardware – handouts, research, discussion • Protocols – TCP/IP, tutor led, research • Architecture – ISPs etc research, gapped handouts
Operating websites • Web languages etc – practical, examples
Assignment 1 - Intro to web design
Designing websites Research existing sites – good and bad, use of effects/colour etc Design tools – storyboards, exercises
Assignment 2 - Design a website
Developing websites • HTML – exercises • Use of components – hyperlinks etc – practical exercises • Combining information – using cameras etc, practical • Testing – formal procedures, practical exercises
Assignment 3 - Implement a website

Assessment

It is suggested that this unit is assessed using a single extended assignment divided into three tasks as summarised in *the Programme of suggested assignments table*.

Learners will need to be given a specific design requirement, or it could be negotiated with them.

Before designing and developing their website, learners can produce notes covering the requirements of learning outcomes 1 and 2, relating this to their own intended development, eg listing the hardware and software components needed, giving examples of markup languages etc. Alternatively, learners could produce this information as a presentation.

For 3.1, 3.2, 3.3 and 3.4 learners must design, develop and test a website. Evidence will come from their design documentation, completed website (annotated screen-shots), witness statements, test records, and 'user' feedback (peer or tutor).

Programme of suggested assignments

The table below shows a programme of suggested assignments that cover the assessment criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
1.1–1.4, 2.1–2.3	Intro to web design	You are to design and build a website for an agreed purpose. Stage 1 is to outline the components and technologies you could use.	Presentation.
3.1, 3.2	Design a website	Produce design documentation for your website.	Documentation.
3.3, 3.4	Implement a website	Develop and test your website.	Screen-shots. Witness statement. Test records. User feedback.

Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC in IT sector suite. This unit has particular links with:

Level 1	Level 2	Level 3
		Web Development
		e-Commerce

This unit maps to some of the underpinning knowledge from the following areas of competence in the Level 2 National Occupational Standards for IT and Telecoms Professionals (ProCom):

4.6   Human Computer Interaction/Interface (HCI) Design

5.2   Software Development.

Essential resources

Access to an internet connection is essential for this unit so that learners are able to review sample websites. All learners should have access to a PC with the following application software:

- authoring software
- web browser.

Where possible it is recommended that learners use a web authoring system to create their pages. This will maximise their productivity and leave more time for researching and applying good design techniques. Whilst it is possible to use a text-based editor, such as Windows Notepad, to write the HTML coding, this can be laborious and the overall benefit to the learner is questionable. However, HTML code should be discussed as part of the unit so that learners have an understanding of its place in the process of web design.

There are various web authoring packages available. For example, Microsoft Front Page, Adobe Dreamweaver, all make website production a fairly intuitive task. In addition, Netscape Navigator includes Composer which enables the user to create web pages directly from within the browser.

Ideally, learners should produce websites that look 'authoring tool independent'. The emphasis in this unit is on learners using a range of tools to complete their sites. They should be able to adjust background colours, use background images, apply text formatting/colours, bullets, etc. Tools that complete multiple actions by the click of a button should be discouraged, for example the use of themes to build comprehensive websites.

Employer engagement and vocational contexts

The use of vocational context is essential in the delivery and assessment of this unit. Learners will require access to computer equipment to enable them to gain a practical awareness and enable them to apply their knowledge and understanding in a practical situation.

There is a range of organisations that may be able to help centres engage and involve local employers in the delivery of this unit, for example:

- Learning and Skills Network – www.vocationallearning.org.uk
- Local, regional business links – www.businesslink.gov.uk
- National Education and Business Partnership Network – www.nebpn.org
- Network for Science, Technology, Engineering and Maths Network Ambassadors Scheme – www.stemnet.org.uk
- Work-based learning guidance – www.aimhighersw.ac.uk/wbl.htm
- Work experience/workplace learning frameworks – Centre for Education and Industry (CEI University of Warwick) – www.warwick.ac.uk/wie/cei

Indicative reading for learners

Textbooks

Brannan James A — *Web Design in Simple Steps* (Prentice Hall, 2009) ISBN 0273723537

Online Training Solutions — *Microsoft Office FrontPage 2003 Step by Step* (Microsoft Press US, 2003) ISBN 0735615195

Vandome D — *Dreamweaver MX 2004 in Easy Steps* (Computer Step, 2004) ISBN 1840782811

Websites

www.excellentsite.org

www.webpagesthatsuck.com

Functional Skills — Level 2

Skill	When learners are …
ICT - Using ICT	
Plan solutions to complex tasks by analysing the necessary stages	designing specified components of a website
Select, interact with and use ICT systems safely and securely for a complex task in non-routine and unfamiliar contexts	developing and testing specified components of a website
ICT - Finding and selecting information	
Select information from a variety of sources to meet requirements of a complex task	stating the role of internet service providers, web hosting services and domain name registrars
ICT - Developing, presenting and communicating information	
Use appropriate software to meet the requirements of a complex data-handling task	developing and testing specified components of a website
Combine and present information in ways that are fit for purpose and audience	listing the hardware and software components which enable the internet and web stating the role of the TCP/IP protocol.