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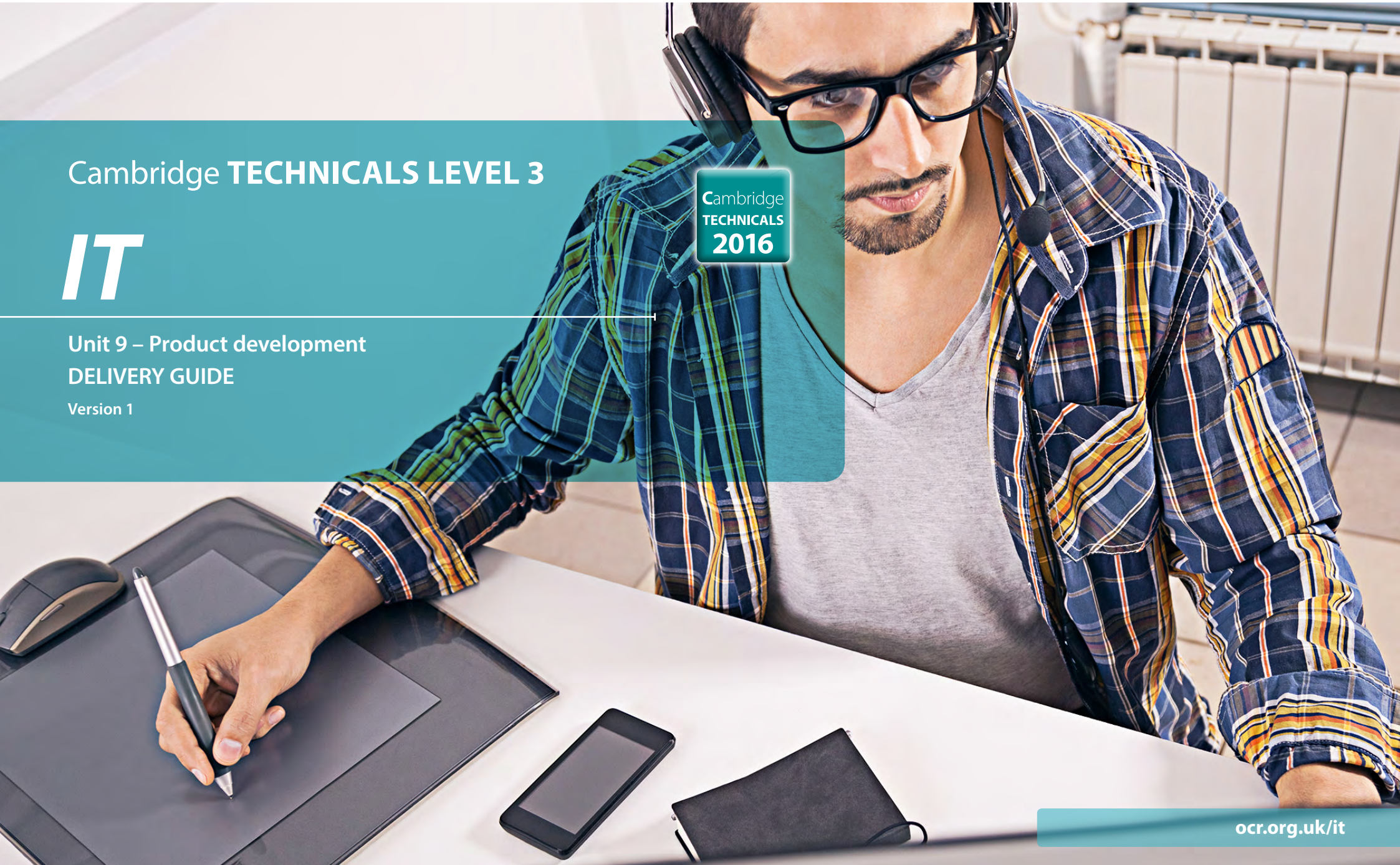

Cambridge **TECHNICALS LEVEL 3**

IT

Cambridge TECHNICALS 2016

Unit 9 – Product development
DELIVERY GUIDE

Version 1

ocr.org.uk/it

CONTENTS

INTRODUCTION

This Delivery Guide has been developed to provide practitioners with a variety of creative and practical ideas to support the delivery of this qualification. The Guide is a collection of lesson ideas with associated activities, which you may find helpful as you plan your lessons.

OCR has collaborated with current practitioners to ensure that the ideas put forward in this Delivery Guide are practical, realistic and dynamic. The Guide is structured by learning outcome so you can see how each activity helps you cover the requirements of this unit.

We appreciate that practitioners are knowledgeable in relation to what works for them and their learners. Therefore, the resources we have produced should not restrict or impact on practitioners' creativity to deliver excellent learning opportunities.

Whether you are an experienced practitioner or new to the sector, we hope you find something in this guide which will help you to deliver excellent learning opportunities.

If you have any feedback on this Delivery Guide or suggestions for other resources you would like OCR to develop, please email resources.feedback@ocr.org.uk.

OPPORTUNITIES FOR ENGLISH AND MATHS SKILLS DEVELOPMENT AND WORK EXPERIENCE

We believe that being able to make good progress in English and maths is essential to learners in both of these contexts and on a range of learning programmes. To help you enable your learners to progress in these subjects, we have signposted opportunities for English and maths skills practice within this resource. We have also identified any potential work experience opportunities within the activities. These suggestions are for guidance only. They are not designed to replace your own subject knowledge and expertise in deciding what is most appropriate for your learners.

English

Maths


Work

Please note

The timings for the suggested activities in this Delivery Guide **DO NOT** relate to the Guided Learning Hours (GLHs) for each unit.

Assessment guidance can be found within the Unit document available from www.ocr.org.uk.

The latest version of this Delivery Guide can be downloaded from the OCR website.

UNIT AIM

The purpose of this unit is to prepare you to undertake product development activities. You will learn about different product design methodologies and the role of the product development life cycle. In addition, you will discover the factors that influence product developments.

The key to any product development being a success is the analysis, client review, design, testing and final acceptance that takes place. The skills that you will learn can be applied to the development of any product, large or small. You will use product development skills and work through the product development life cycle.

Whether you are building a network, developing a website, developing a system for data analytics or creating an augmented or virtual reality resource, they are all products. It is therefore important that you understand the processes required for the development of products and that you can apply them to a variety of situations.

It is recommended that you develop a product alongside the other units you are studying so that you can explore the units holistically as a wider project. If this unit is being taken as part of a specialist pathway, the product developed could align to your chosen pathway and support progression into your chosen field within the IT industry.

Unit 9 Product development	
LO1	Understand the product development life cycle
LO2	Be able to design products that meet identified client requirements
LO3	Be able to implement and test products
LO4	Be able to carry out acceptance testing with clients

To find out more about this qualification please go to: http://www.ocr.org.uk/qualifications/cambridge-technicals-it-level-3-certificate-extended-certificate-introductory-diploma-foundation-diploma-diploma-05838-05842-2016-suite

Cambridge TECHNICALS 2016

2016 Suite

- **New suite for first teaching September 2016**
- **Externally assessed content**
- **Eligible for Key Stage 5 performance points from 2018**
- **Designed to meet the DfE technical guidance**

RELATED ACTIVITIES

The Suggested Activities in this Delivery Guide listed below have also been related to other Cambridge Technicals in IT units/Learning Outcomes (LOs). This could help with delivery planning and enable learners to cover multiple parts of units.

This unit (Unit 9)	Title of suggested activity	Other units/LOs	
LO1	Development methodologies	Unit 5 Virtual and augmented reality	LO2 Be able to design virtual and augmented reality resources
		Unit 11 Systems analysis and design	LO1 Understand the role of systems analysis and design in relation to the systems development lifecycle
	What are constraints?	Unit 6 Application design	LO2 Be able to investigate potential solutions for application developments
		Unit 12 Mobile technology	LO3 Be able to determine solutions for the use of mobile technologies
	Regulatory and social constraints	Unit 2 Global information	LO4 Understand the legal and regulatory framework governing the storage and use of global information
		Unit 12 Mobile technology	LO3 Be able to determine solutions for the use of mobile technologies
LO2	New product visualisation	Unit 1 Fundamentals of IT	LO1 Understand computer hardware LO2 Understand computer software LO3 Understand business IT systems
		Unit 2 Global information	LO3 Understand the use of global information and the benefits to individuals and organisations
		Unit 17 Internet of Everything	LO3 Be able to present concept ideas for repurposed developments
	Clients' and users' needs and wants	Unit 1 Fundamentals of IT	LO4 Understand employability and communication skills used in an IT environment
		Unit 12 Mobile technology	LO3 Be able to determine solutions for the use of mobile technologies
		Unit 14 Software engineering	LO2 Be able to investigate business requirements for programming solutions
	Functional and non-functional requirements	Unit 1 Fundamentals of IT	LO5 Understand ethical and operational issues and threats to computer systems
		Unit 6 Application design	LO2 Be able to investigate potential solutions for application developments
	Design phase 1 – the outline solution	Unit 2 Global information	LO5 Understand the process flow of information
		Unit 5 Virtual and augmented reality	LO2 Be able to design virtual and augmented reality resources
	Design phase 2 – the presentation	Unit 1 Fundamentals of IT	LO4 Understand employability and communication skills used in an IT environment
		Unit 15 Games design prototyping	LO4 Be able to present and evaluate game concepts
	Design phase 3 – the final design solution	Unit 2 Global information	LO6 Understand the principles of information security
		Unit 14 Software engineering for business	LO3 Be able to develop software solutions to meet business requirements
LO3	Looking at the implementation of a product	Unit 3 Cyber security	LO2 Understand the issues surrounding cyber security
		Unit 5 Virtual and augmented reality	LO3 Be able to create a virtual or augmented reality resource
		Unit 11 Systems analysis and design	LO4 Be able to create logical and physical designs for specified business systems
		Unit 15 Games design prototyping	LO3 Be able to develop game prototypes
		Unit 21 Web design and prototyping	LO3 Be able to create prototype websites for an identified client
	Unit testing	Unit 21 Web design and prototyping	LO3 Be able to create prototype websites for an identified client

This unit (Unit 9)	Title of suggested activity	Other units/LOs	
LO4	Creating the user acceptance test plan	Unit 8 Project management	LO2 Be able to initiate and plan projects
	Acceptance testing with target users	Unit 11 Systems analysis and design	LO4 Be able to create logical and physical designs for specified business systems
	What is product maintenance?	Unit 5 Virtual and augmented reality	LO4 Be able to predict future applications for virtual or augmented reality.

KEY TERMS

Explanations of the key terms used within this unit, in the context of this unit	
Key term	**Explanation**
Acceptance testing	A test conducted to determine if the requirements of a specification or contract are met. It may involve, for example, chemical tests, physical tests, or performance tests.
Product development methodology	A development methodology is the process by which an engineering team will build a given product e.g. Waterfall, Incremental, Spiral or Agile development.
Requirements analysis	Also called requirements engineering, this is the process of determining user expectations for a new or modified product. These features, called requirements, must be quantifiable, relevant and detailed. In software engineering, such requirements are often called functional specifications. Examples of requirements are quality and process.
User acceptance testing (UAT)	Also called beta testing, application testing and end user testing, this is a phase of product development in which the product is tested in the 'real world' by the intended audience. Most examples seen relate to software development.

MISCONCEPTIONS

Some common misconceptions and guidance on how they could be overcome		
What is the misconception?	**How can this be overcome?**	**Resources which could help**
That design constraints are the same as design criteria	By gaining familiarity with definitions and examples of the two terms.	This website gives definitions and examples using easily understood illustrations: http://cuba.coventry.ac.uk/maedesign/planning-and-clarification/l1-%E2%80%93-constraints-and-criteria/
That client needs and user needs mean the same	By looking at explanations of client needs, user needs with relevant examples.	This website discusses both client and user needs in the context of having to balance the features and facilities provided for the users with the commercial requirements of the client: http://miscmagazine.com/service-design-balancing-user-needs-and-client-requirements/
That acceptance testing is the same as user acceptance testing	By explanation, referring to the Key Terms above. By careful differentiation of the terms when introducing the topics during the delivery of Learning Outcome 4.	This website discusses acceptance testing: http://softwaretestingfundamentals.com/acceptance-testing/ This website presentation discusses user acceptance testing: http://www.slideshare.net/Softwarecentral/user-acceptance-testing-slide-show-125-mb-ppt

SUGGESTED ACTIVITIES

LO No:	1		
LO Title:	**Understand the product development life cycle**		
Title of suggested activity	**Suggested activities**	**Suggested timings**	**Also related to**
What is product development?	Learners could research definitions independently. The various definitions could be compared and discussed in a group so that learners arrive at an understanding of the term. Learners could also access business studies related media to enhance their knowledge and understanding; for example: BBC Bitesize http://www.bbc.co.uk/schools/gcsebitesize/design/graphics/evaluationictrev2.shtml Uses the context of graphics product development. Product design through research and development is outlined in: http://businesscasestudies.co.uk/syngenta/product-design-through-research-and-development/new-product-development.html	40 minutes	
Development methodologies	Learners, individually or in small groups, could research the different development methodologies, examples of which are given in the Teaching Content. There are numerous online sources; for example: Department of Health & Human Services USA Selecting a Development Approach https://www.cms.gov/research-statistics-data-and-systems/cms-information-technology/xlc/downloads/selectingdevelopmentapproach.pdf Learners could feed back to the main group and, for example, construct a table of the features of each methodology to gain understanding of similarities and differences.	1.5 hours	Unit 5 LO2 Unit 11 LO1
The development life cycle 1	Familiarity with stages of the development life cycle could be achieved by giving learners a blank life cycle image and a separate list of the phases. The learners then place each phase in the order in which they think it comes. The results could be reviewed as a group. Complete examples are available for reference in software development textbooks and on the Internet; for example: http://www.yartoo.com.au/software.htm	45 minutes	
The development life cycle 2	As an extension to the above activity, learners could research examples of the activities that could take place under each heading e.g. stakeholder interviews for requirements analysis.	45 minutes	

Title of suggested activity	Suggested activities	Suggested timings	Also related to
What are constraints?	Learners could read a short piece explaining project constraints with examples; for example: Project Management: How to Define Project Constraints http://www.dummies.com/how-to/content/project-management-how-to-define-project-constrain.html Learners could gain understanding of the need for compromise by researching and discussing the relationship between constraints such as scope and resources. The use of an image showing basic constraints could help the discussion. Images are available on the Internet at: https://www.unicon.net/about/articles/avoiding-iron-triangle	1.5 hours	Unit 6 LO2 Unit 12 LO3
Regulatory and social constraints	Learners could be divided into small groups to research social constraints, regulation and standards organisations and the areas that they influence. Each group could be given a social constraint, a standards body and an organisation to investigate and prepare a short presentation. Learners could be encouraged to consider a wide range of client industries rather than restricting themselves to the IT industry. For example, BS 5930:2015 Code of practice for ground investigations: "*… also contains guidance on complete reporting of the results of the investigation for use by others in the design chain whether by paper or, nowadays, using digital data transfer formats.*" Each group could present its findings to the other groups.	1.5 hours	Unit 2 LO4 Unit 12 LO3

SUGGESTED ACTIVITIES

LO No:	2		
LO Title:	**Be able to design products that meet identified client requirements**		
Title of suggested activity	**Suggested activities**	**Suggested timings**	**Also related to**
New product visualisation	Learners could visualise a simple product. The product could be one, for example, that addresses an accessibility or healthcare issue. For example, an In Case of Emergency (ICE) wristband using a Near Field Communication (NFC) tag or, a new development or re-purposing of an existing digital product.	1 hour	Unit 1 LO1, LO2, LO3 Unit 2 LO3 Unit 17 LO3
Clients' and users' needs and wants	Learners could discuss potential clients for the product and identify needs and wants that it would meet for the end users. Comparisons of features could be made with similar existing products available on the market. If the example in the activity above is used, comparisons could be made with this by researching other existing products using the Internet.	30 minutes	Unit 1 LO4 Unit 12 LO3 Unit 14 LO2
Functional and non-functional requirements	Learners could independently investigate the meaning of 'functional requirements' and 'non-functional requirements'. There are a large number of websites that provide information on the topic, however many use language that may be difficult for learners to understand. Therefore a directed approach would be more appropriate, to websites such as: http://www.requirementone.com/Thought-leadership/Blog/2012/02/20/What-is-the-difference-between-business-and-functional-requirements The learners could also be asked to note examples of functional requirements to add to an ongoing discussion of the topic.	45 minutes	Unit 1 LO5 Unit 6 LO2
Identifying the functional and non-functional features of a product	Learners, in small groups or individually, could be given a digital product to analyse in order to identify the functional and non-functional features. For example, the ICE wristband identified in the New product visualisation activity above could have a functional feature of a double catch clasp for security. A non-functional feature could be any decorative stitching. Functional and non-functional features are usually described in the product details in a catalogue or website. These could be referred to by the learners and used to categorise into lists of the two types of feature. Feedback from the groups/individuals to the main group could be used, by the tutor, to check responses and arrive at a list of the appropriate features.	1.5 hours	
Design phase 1 – the outline solution	Working in small groups, learners could produce an outline solution for the product visualised in the new product visualisation activity above, which addresses the topics from Teaching Content 2.1 Design phase – Outline solutions. The learners could be given a checklist and add their responses to it.	1.5 hours	Unit 2 LO5 Unit 5 LO2

Title of suggested activity	Suggested activities	Suggested timings	Also related to
Design phase 2 – the presentation	Following the activity above, learners could carry out a group presentation of their solutions to the tutor who would be role playing the client. Alternatively, a local employer might play the part of a client. A checklist of decisions/follow-up actions and deadline dates could be developed from the Teaching Content 2.2 Design phase – Presentation of outline solutions to the client.	1 hour	Unit 1 LO4 Unit 15 LO4
Design phase 3 – the final design solution	Following the activity above, working in small groups, learners could refine and add to their outline solution by following the topics from Teaching Content 2.1 Design phase – final design solution.	1 hour	Unit 2 LO6 Unit 14 LO3

SUGGESTED ACTIVITIES

LO No:	3		
LO Title:	**Be able to implement and test products**		
Title of suggested activity	**Suggested activities**	**Suggested timings**	**Also related to**
Looking at the implementation of a product	Learners could be given a product to research. They could look into its origins in terms of whether it is a completely new product, or a development of one already in existence. They could identify and list its functions as a precursor to the next activity of testing the product.	1 hour	Unit 3 LO2 Unit 5 LO3 Unit 11 LO4 Unit 15 LO3 Unit 21 LO3
Unit testing	Learners could carry out the testing of each of the individual functions of the product identified in the activity above. For example, a mobile phone could have each of its functions tested separately e.g. NFC detection of an NFC tag.	1 hour	Unit 21 LO3
Integration testing	Following the activity above, learners could carry out the tests to ensure that the individual functions work together as expected. For example, a mobile phone could be tested to check that an NFC tag started the expected application.	1 hour	
Product enhancement and improvement	Learners could use the unit and integration testing results identified in the activities above as a basis for suggesting enhancements and/or improvements to the product. The addition of a wordbank of words relating to the product could add additional inspiration. The improvements/enhancements could be illustrated by developing a mind map.	45 minutes	
The implementation log	Tutors could ask learners to revisit the documentation developed in the different activities above, for the stages of the product development, in order to arrive at an appropriate representation of an implementation log. Tutors could ask learners to investigate the use of a blog or vlog.	45 minutes	
Revisiting the implementation plan	Learners could research examples of implementation plans and note the features for use in a discussion. The learners could then take part in a tutor-led discussion of the implementation plan to cover areas such as its strength and weaknesses. The discussion could also be used to arrive at a list of suitable contents for the implementation plan and development of an outline layout.	1 hour	

SUGGESTED ACTIVITIES

LO No:	4		
LO Title:	**Be able to carry out acceptance testing with clients**		
Title of suggested activity	**Suggested activities**	**Suggested timings**	**Also related to**
What is acceptance testing?	Learners could investigate the meaning of 'acceptance testing'. There are a large number of websites (e.g. http://softwaretestingfundamentals.com/acceptance-testing/) that provide information on the topic. Learners could be encouraged to discover a definition, and what acceptance testing involves, in order to provide the underpinning knowledge for the production of the acceptance test plan. Findings could be brought together via group work, sharing the definitions and examples of the type of tests that could be included.	30 minutes	
Creating the acceptance test plan	There are a number of websites where further information on the structure and content of acceptance test plans can be sourced. The following website gives a good overview and a template relating to acceptance test planning for a software product: https://classes.soe.ucsc.edu/cmps115/Winter04/project-acceptance-test.html Tutors could allocate sections of the acceptance test plan to groups of learners who could devise a number of functional and non-functional tests for an example product. The results could be brought together to form the basis for an acceptance test plan. The whole group could then discuss the plan to identify any omissions or duplications.	1 hour	
What is user acceptance testing?	Learners could investigate the meaning of 'user acceptance testing'. There are a large number of websites and online videos that provide information on the topic. Learners could be encouraged to discover a definition, and what user acceptance testing involves, in order to provide the underpinning knowledge for the production of the user acceptance test plan. Findings could be brought together through group work, sharing the definitions and examples of the types of tests that could be included. The following example provides a definition and gives an example of a test case document: http://www.slideshare.net/Softwarecentral/user-acceptance-testing-slide-show-125-mb-ppt	45 minutes	
Creating the user acceptance test plan	Tutors could allocate sections of the acceptance test plan to different groups of learners who could devise a number of functional and non-functional tests for an example product. The results could be brought together to form the basis for an acceptance test plan. The whole group could then discuss the plan to identify any omissions or duplications.	1.5 hours	Unit 8 LO2

Title of suggested activity	Suggested activities	Suggested timings	Also related to
Acceptance testing with target users	User acceptance testing could be simulated by learners role playing users based on the user profiles listed in the design specification. Other learners could role play product developers and record the results of the testing. Learners could follow up by role playing the client to make the deployment decision (e.g. acceptance, non-acceptance or acceptance after modifications and retest).	1.5 hours	Unit 11 LO4
What is product maintenance?	Learners could gain an understanding of product maintenance from investigation of strategies to extend product life. The investigation could be carried out individually or in small groups followed by sharing the findings. BBC BiteSize provides a background to product life and the features that can prolong it: http://www.bbc.co.uk/schools/gcsebitesize/design/resistantmaterials/designsocialrev7.shtml Learners, in groups, could investigate product maintenance for a given product under the sub-headings in the Teaching Content, 4.2 Maintenance phase: • routine maintenance • enhancements to product features and functions • product upgrades. A car is an example of a product which is subject to all three phases. Learners could discuss what actions are carried out e.g. the car has a service at set intervals, and which category the action falls into. The groups could be brought together to compare findings.	1.5 hours	Unit 5 LO4

The small print

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