

Cambridge **TECHNICALS LEVEL 3**

**IT**

Cambridge  
**TECHNICALS**  
**2016**

**Unit 5**

**Virtual and augmented reality**

K/507/5004

Guided learning hours: 60

Version 2 - revised May 2016

\*changes indicated by black vertical line

## LEVEL 3

### UNIT 5: Virtual and augmented reality

K/507/5004

**Guided learning hours:** 60

**Essential resources required for this unit:** Learners need to be given access to the software and tools needed to create both virtual and augmented reality products. In order to assess examples of virtual and augmented reality products, learners will need access to completed products and the designs that have led to their creation.

If a virtual reality headset e.g. Oculus Rift is provided or used to create, develop and test learner's work, then the Centre must be fully aware of the issues connected with its use. The Centre is advised to undertake its own research into the health and safety issues. A starting point is offered here:

<http://static.oculus.com/documents/gear-vr-health-and-safety-warnings.pdf>

<http://www.livescience.com/49669-virtual-reality-health-effects.html>

**This unit is internally assessed and externally moderated by OCR.**

#### UNIT AIM

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Virtual reality is a simulated environment that is intended to replicate the physical experience of being in places in the real or imagined worlds by giving the user sensory experiences that match those which would be experienced were the user actually in that environment. Augmented reality is the process of changing the user's view of the real world in order to give them an improved, or more detailed, view of what they are seeing.

You will learn about both technologies and how they are used. You will research both technologies and design both a virtual and an augmented reality resource. Finally, you will use your research and skills learnt whilst designing and creating resources to suggest future applications for virtual and augmented reality.

This unit is mandatory to the emerging digital technology practitioner specialist pathway in the Level 3 Diploma suite of qualifications due to its relevance to emerging digital technologies. The unit supports the development of skills, knowledge and understanding relevant to a job role in the areas of 3D modelling, digital transformation and even the film and games industry.

## TEACHING CONTENT

The teaching content in every unit states what has to be taught to ensure that learners are able to access the highest grades.

Anything which follows an i.e. details what must be taught as part of that area of content. Anything which follows an e.g. is illustrative, it should be noted that where e.g. is used, learners must know and be able to apply relevant examples in their work, although these do not need to be the same ones specified in the unit content.

For internally assessed units you need to ensure that any assignments you create, or any modifications you make to an assignment, do not expect the learner to do more than they have been taught, but must enable them to access the full range of grades as described in the grading criteria.

Learning outcomes	Teaching content
The Learner will:	Learners must be taught:
1. Understand virtual and augmented reality and how they may be used	1.1. Virtual reality as a concept i.e.: <ul style="list-style-type: none"> <li>• pioneers of virtual and augmented reality e.g.:               <ul style="list-style-type: none"> <li>○ Douglas Engelbart</li> <li>○ Ivan Sutherland</li> <li>○ Tom Caudell and David Mizell</li> </ul> </li> <li>• uses of virtual and augmented reality e.g.:               <ul style="list-style-type: none"> <li>○ US Military Nuclear Defence systems</li> <li>○ pilot training</li> <li>○ Mattel “data glove”</li> <li>○ personal guidance system for visually impaired</li> <li>○ chameleon</li> </ul> </li> </ul> 1.2. Areas of use, e.g.: <ul style="list-style-type: none"> <li>• architecture</li> <li>• business (marketing, service and planned maintenance)</li> <li>• education (e.g. textbooks, skills development, remote collaboration)</li> <li>• entertainment, leisure and the media (tourism, games, museums)</li> <li>• health care and surgery (training, simulations)</li> <li>• military (training, simulations)</li> <li>• sport (live streaming of scores and other statistics, sponsorship images)</li> </ul> 1.3. Possible impacts, i.e.: <ul style="list-style-type: none"> <li>• visualisation of designs</li> <li>• simulations</li> <li>• training</li> <li>• demonstrations of concepts</li> <li>• virtual tours</li> </ul>

Learning outcomes	Teaching content
The Learner will:	Learners must be taught:
<p>2. Be able to design virtual and augmented reality resources</p>	<p>2.1. Technologies, i.e.:</p> <ul style="list-style-type: none"> <li>• hardware <ul style="list-style-type: none"> <li>○ processor</li> <li>○ display (e.g. handheld device, head mounted display, eyeglasses, head up display)</li> <li>○ sound (e.g. speakers, headphones)</li> <li>○ sensors (e.g. optical, accelerometer, GPS, compass, RFID)</li> <li>○ input devices (e.g. camera, microphone)</li> </ul> </li> <li>• software <ul style="list-style-type: none"> <li>○ range of products available</li> <li>○ features of the software</li> <li>○ image registration</li> <li>○ Augmented Reality Mark-up Language</li> </ul> </li> </ul> <p>2.2. Design, i.e.:</p> <ul style="list-style-type: none"> <li>• aims of the product (e.g. intended outcome, success criteria, information to be delivered, where the product is to be used)</li> <li>• financial plan</li> <li>• quality plan</li> <li>• target audience (e.g. age, gender, income)</li> <li>• nature of the product (e.g. single user product, multiuser product)</li> <li>• content including resource plan</li> <li>• design tools (e.g. storyboarding, mind mapping, mood boards)</li> <li>• trigger image(s) and the stage(s) that follow on from the trigger being accessed.</li> <li>• hardware and software requirements</li> </ul>
<p>3. Be able to create a virtual <b>or</b> augmented reality resource</p>	<p>3.1. Develop, i.e.:</p> <ul style="list-style-type: none"> <li>• create the trigger point of interest</li> <li>• create the layer(s)/overlay(s)</li> </ul> <p>3.2. Testing, i.e.:</p> <ul style="list-style-type: none"> <li>• create a test plan</li> <li>• testing during development</li> <li>• end user testing</li> <li>• review against original success criteria</li> </ul> <p>3.3. Evaluation, i.e.:</p> <ul style="list-style-type: none"> <li>• design stage: <ul style="list-style-type: none"> <li>○ has the project: <ul style="list-style-type: none"> <li>▪ identified suitable success criteria</li> </ul> </li> </ul> </li> <li>• project management stage: <ul style="list-style-type: none"> <li>○ has the project: <ul style="list-style-type: none"> <li>▪ deviated from the original scope</li> <li>▪ deviated from the budget as defined in the financial plan</li> </ul> </li> </ul> </li> </ul>

Learning outcomes	Teaching content
The Learner will:	Learners must be taught:
	<ul style="list-style-type: none"> <li>• creation stage:               <ul style="list-style-type: none"> <li>○ has the project:                   <ul style="list-style-type: none"> <li>▪ delivered business benefits identified in the business case</li> <li>▪ achieved the objectives in the terms of reference</li> <li>▪ deviated from forecast resource levels as per the resource plan</li> <li>▪ conformed to the management process as per the execution phase</li> </ul> </li> </ul> </li> <li>• identify potential improvements for similar future projects</li> </ul>
<p>4. Be able to predict future applications for virtual and augmented reality</p>	<p>4.1. Future uses, i.e.:</p> <ul style="list-style-type: none"> <li>• possible developments of virtual and augmented reality and how these may impact on society. (e.g. advances in treating injuries or disease, leisure activities, the environment, the home and education).</li> </ul> <p>4.2. Re-purposing, i.e.:</p> <ul style="list-style-type: none"> <li>• how existing products may be re-purposed and used in wholly new ways</li> <li>• benefits of repurposing using current examples of resources in new ways (e.g. medical uses in the field of animal welfare, training uses in the field of education)</li> <li>• heads up display used to augmented learning in schools</li> </ul>

## GRADING CRITERIA

LO	Pass	Merit	Distinction
	The assessment criteria are the Pass requirements for this unit.	To achieve a Merit the evidence must show that, in addition to the pass criteria, the candidate is able to:	To achieve a Distinction the evidence must show that, in addition to the pass and merit criteria, the candidate is able to:
1. Understand virtual and augmented reality and how they may be used	P1*: Describe the uses of virtual and augmented reality by organisations (*Synoptic assessment from Unit 1 Fundamentals of IT, Unit 2 Global information and Unit 3 Cyber security)	M1: Explain the impact that an identified virtual reality resource has had on society	D1: Assess the impact that an identified augmented reality resource has had on society
2. Be able to design virtual and augmented reality resources	P2: Produce a design specification for a virtual reality resource for an identified purpose		
	P3: Produce a design specification for an augmented reality resource for an identified purpose		
3. Be able to create a virtual or augmented reality resource	P4: Develop a virtual reality or an augmented reality resource for an identified purpose		
	P5: Test the product during creation and once complete		
4. Be able to predict future applications for virtual and augmented reality	P6: Suggest possible future roles of virtual and augmented reality in future applications	M3: Evaluate the specific benefits to be gained by repurposing current examples of virtual and augmented reality into identified roles	

## SYNOPTIC ASSESSMENT

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When learners are taking an assessment task, or series of tasks, for this unit they will have opportunities to draw on relevant, appropriate knowledge, understanding and skills that they will have developed through other units. We've identified those opportunities in the grading criteria (shown with an asterisk). Learners should be encouraged to consider for themselves which skills/knowledge/understanding are most relevant to apply where we have placed an asterisk.

## ASSESSMENT GUIDANCE

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### **LO1 Understand virtual and augmented reality and how they may be used.**

**P1:** Learners are required to describe the use of virtual and augmented reality by organisations. Learners should discuss at a wide range of uses and include examples of where and how they are used. The learner must ensure that they clearly identify whether they are describing virtual or augmented reality applications and their uses. The evidence could be presented as a report, part of a technical guide or a presentation (either videoed or with detailed speaker notes).

**M1:** Learners are required to select one example of a virtual reality resource and explain the impact that the use of the identified technology has had on society. The evidence could be in the form of a presentation (either videoed or with detailed speaker notes), report, or information sheet.

**D1:** Learners are required to select one example of an augmented reality resource and assess the impact that the use of the identified technology has had on society. The evidence could be in the form of a presentation (either videoed or with detailed speaker notes), report or information sheet.

### **LO2 Be able to design virtual and augmented reality resources.**

It is important that learners are provided with a scenario that will enable them design a virtual and an augmented reality resource.

**P2:** Learners are required to produce a design specification for an identified purpose for a virtual reality resource. The design specification must include the items to be created in LO3. This evidence should be the design specification which includes the actual designs, e.g. storyboard, mood board etc.

**P3:** Learners are required to produce a design specification for an identified purpose for an augmented reality resource. The design specification must include the items to be created in LO3. This evidence should be the design specification which includes the actual designs, e.g. storyboard, mood board etc.

### **LO3 Be able to create a virtual or augmented reality resource.**

Learners need to select and develop **one** of the design specifications from LO2.

**P4:** Learners are required to develop either a virtual reality resource **or** an augmented reality resource for an identified purpose. The evidence for this assessment criterion should be the completed product, along with evidence that the product works as intended. This evidence for functionality of the product could be a witness statement or video evidence of the completed product in use.

**P5:** Learners must test the product **both** during the creation **and** once it has been created. The evidence will include the test plan, confirming the testing of the functionality during creation and at the end of the final testing stage.

**M2:** Learners must review the results of the testing and make adjustments to their design. The expectation is that in any development and testing process there are always aspects of the design that need further consideration. This is why it is important that iterative testing is carried out. The evidence will be the test results and supporting documentation of any changes made to the design.

**D2:** Learners are required to evaluate the development stages of the creation process. The evaluation must consider the design, project management and creation stages and include the bullet points for each section within the teaching content from the section headed “**Evaluation**”. The evidence will be the documented evaluation. This could be in the form of a report or a presentation with detailed speaker notes or a video of learners presenting the results of their evaluation.

#### **LO4 Be able to predict future applications for virtual or augmented reality.**

**P6:** Learners are required to suggest possible future roles for virtual and augmented reality in future applications. Both virtual and augmented reality should be considered and a range (at least three) of predictions should be made. The evidence could be a written report, a journalistic report (to camera or as a written piece for inclusion in a magazine), or a presentation with detailed speakers notes.

**M3:** Learners are required to use the research into current uses of virtual and augmented reality applications in LO1 to identify and describe the benefits to be gained by utilising specified applications in new and creative ways. Both virtual and augmented reality should be considered and a range (at least three) of possible instances of repurposing should be made. The evidence could be a written report, a journalistic report (to camera or as a written piece for inclusion in a magazine), or a presentation with detailed speakers notes.

**Feedback to learners:** you can discuss work-in-progress towards summative assessment with learners to make sure it's being done in a planned and timely manner. It also provides an opportunity for you to check the authenticity of the work. You must intervene if you feel there's a health and safety risk.

Learners should use their own words when producing evidence of their knowledge and understanding. When learners use their own words it reduces the possibility of learners' work being identified as plagiarised. If a learner does use someone else's words and ideas in their work, they must acknowledge it, and this is done through referencing. Just quoting and referencing someone else's work will not show that the learner knows or understands it. It has to be clear in the work how the learner is using the material they have referenced **to inform their** thoughts, ideas or conclusions.

For more information about internal assessment, including feedback, authentication and plagiarism, see the centre handbook. Information about how to reference is in the OCR *Guide to Referencing* available on our website: <http://www.ocr.org.uk/i-want-to/skills-guides/>.

## EMPLOYABILITY SKILLS

Employability skills	Learning outcome
Communication	P1, P2, P3, M1, M2, M3, D1,D2
Problem solving/decision making	P1, P2, P3, P6, M43, D2
Time management	P4,P5, M2
Critical thinking	P2, P3, P6, M1, M3

## MEANINGFUL EMPLOYER INVOLVEMENT - a requirement for the Diploma (Tech Level) qualifications

The 'Diploma' qualifications have been designed to be recognised as Tech Levels in performance tables in England. It is a requirement of these qualifications for centres to secure for every learner employer involvement through delivery and/or assessment of these qualifications.

The minimum amount of employer involvement must relate to at least one or more of the elements of the mandatory units. This unit is a mandatory unit in the Emerging Digital Technology Practitioner pathway and in the Digital Technician pathway.

Eligible activities and suggestions/ideas that may help you in securing meaningful employer involvement for this unit are given in the table below.

Please refer to the *Qualification Handbook* for further information including a list of activities that are not considered to meet this requirement.

Meaningful employer involvement	Suggestion/ideas for centres when delivering this unit
1. Learners undertake structured work-experience or work-placements that develop skills and knowledge relevant to the qualification.	Learners should be given the opportunity to carry out work experience visits and placements in organisations that are involved in the creation and use of virtual and augmented reality. It is likely you will have limited opportunities to offer practical experience of the creation of such resources other than on a fairly basic level. Whilst this is sufficient for this qualification, the option of exploring these concepts in a more focussed manner should be taken if offered.
2. Learners undertake project(s), exercises(s) and/or assessments/examination(s) set with input from industry practitioner(s).	You could contact local organisations that would benefit from the use of virtual or augmented reality and offer them the opportunity to set their own assignment. A range of such assignments could be offered to learners (possibly with learners expected to pitch their ideas before they are given the project). Once completed, these organisations could be involved in the assessment and feedback provided to learners.

To find out more

**[ocr.org.uk/it](http://ocr.org.uk/it)**

or call our Customer Contact Centre on **02476 851509**

Alternatively, you can email us on **[vocational.qualifications@ocr.org.uk](mailto:vocational.qualifications@ocr.org.uk)**



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