



# **ATHE Level 3 Diploma in Information and Digital Technologies**

603/6569/9

Specification Version v0.1 Valid from 31 August 2020.



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## Introduction

### About ATHE

Awards for Training and Higher Education (ATHE) is a global awarding organisation regulated by Ofqual and other United Kingdom and international regulators. We provide centres with a wide variety of qualifications including, but not limited to, business and management, law, computing, health and social care and religious studies.

For the full list please visit our website: [www.athe.co.uk](http://www.athe.co.uk)

ATHE has also developed a range of bespoke qualifications for clients.

**The ATHE mission** is to provide outstanding qualifications, customer service and support, enabling centres to thrive and their learners to achieve and progress. We will support this mission by:

- providing qualifications which enable learners to fulfil their potential and make a positive contribution to society both socially and economically
- delivering the highest standards of customer service
- delivering support and guidance which meet the needs of all centres and enable them to improve performance
- upholding and maintaining the quality and standards of qualifications and assessments
- having a commitment to lifelong learning and development

### Our Qualifications

Our qualifications have been created with the involvement of expert input from managers and teachers in colleges, industry professionals and our qualification development team. We have also taken into account feedback from learners and consulted with higher education institutions to ensure the qualifications facilitate progression to higher levels. We offer a suite of awards, certificates and diplomas across many RQF levels.

Key features of the qualifications include:

- regular reviews of the units and the associated support materials so they are current and meet the needs of learners
- alignment of the programmes of learning to degree and higher degree qualifications in HEIs in the UK and international institutions so there is comparability and smooth progression for learners
- core units that are common to different sectors offering the opportunity for learners to move between sectors or delay decisions on particular specialisms
- optional units offering the opportunity for learners to choose specialist units which best match their job, interests and progression aspirations.
- small qualifications that can be used for professional development for those in employment or for learners who do not have the time to undertake a full-time programme
- challenging and relevant learning with flexible methods of assessment allowing tutors to select the most appropriate methods for their learners
- opportunities for learners to achieve higher grades by unit and overall qualification and reach their maximum potential
- learning that develops knowledge, understanding and skills e.g. problem solving, interpersonal skills needed by effective managers.

## Support for Centres

We are committed to supporting our centres and offer a range of training, support and consultancy services including:

- a comprehensive guide for centres on delivering ATHE qualifications
- qualification guidance, assessor guidance, suggested resources and sample assignments for all units which have been written and verified by experienced practitioners
- verification and guidance with internally devised assignments
- guidance on how to deliver, assess and quality assure the qualifications
- an ATHE centre support officer who guides centres through the recognition process, learner registration and learner results submission
- health check visits to highlight areas of good practice and any areas for development
- an allocated member of our team who can work with centres to support further improvements in the quality of teaching, learning and assessment
- the services of a team of experienced external quality assurers
- opportunities for training and staff development
- access to free webinars to support delivery, assessment and QA processes
- support for business development.

## ATHE Qualification at Level 3 in this Specification

This document provides key information on the ATHE Level 3 Diploma in Information and Digital Technologies, including the rules of combination, the content of all the units and guidance on assessment and curriculum planning. It should be used in conjunction with the ATHE handbook "Delivering ATHE Qualifications". Further guidance and supporting documentation on curriculum planning, internal verification and assessment is provided separately in the Delivering ATHE Qualifications Guide and via the ATHE website.

This qualification is regulated by Ofqual and is listed on Ofqual's Register of Regulated Qualifications. Each qualification has a Qualification Number (QN). This number will appear on the learner's final certification documentation. Each unit within a qualification also has a Unit Reference Number.

The QN number for this qualification is as follows:

|  |            |
|--|------------|
| ATHE Level 3 Diploma in Information and Digital Technologies | 603/6569/9 |
|--|------------|

## Regulation Dates

The regulation date and operational start date in centres for this qualification is 28 August 2020.

## Availability

This qualification is available to learners who are registered at a recognised ATHE centre which is based in England, Wales or internationally, outside of the United Kingdom.

## Introduction to the Level 3 Diploma in Information and Digital Technologies

### Context

This qualification sits within a suite of ATHE L3 qualifications, which is called the International Access Programme (IAP). Each qualification has a credit value of 60. Learners may choose to study one or more of the qualifications in this suite. Extending the learning to more than one qualification will increase knowledge, understanding and the development of a range of study skills. It will also increase the total number of credits achieved so learners are more qualified to access higher education, higher level apprenticeships or employment. Learners can choose complimentary qualifications e.g. Diploma in Business with a Diploma in Small Business and Social Enterprise Start-

up or contrasting qualifications e.g. Diploma in Accounting with a Diploma in Law. The choice must be influenced by learner interests and career aspirations.

## **Study Skills**

Study skills are an important set of generic and transferable skills. All of the qualifications in the IAP develop Study Skills. The development and application of study skills will enable learners to achieve their current qualification; be better prepared for higher education; support lifelong learning and progress in employment.

In the Diploma in Information and Digital Technologies the following study skills will be developed and learners will use them in their study and in preparing and writing the summative assignment. They are therefore integral to the learning and learners will provide evidence in their portfolio to show that they have been applied.

- Critical thinking
- Planning, organising and time management
- Research
- Gathering information, note taking and summarising
- Analysis
- Oral and written skills
- Academic skills, including referencing
- Application of IT skills
- Reflection

The application of the study skills will be signposted in assignments and will therefore form part of the assessment process.

Reflection as a skill is essential as it helps individual learners to identify their strengths and areas requiring further development. Reflection can take place at any stage in the learning and summatively at the end of the learning as is the case in this qualification. However, it must be applied at the outset via a study/skills audit, which is included in the Learner Handbook. The outcomes of the audit should be discussed with the tutor and it needs to be submitted with the rest of the evidence in the portfolio. This will ensure it is part of the external moderation or the verification process.

## **Aims of the Level 3 Diploma in Information and Digital Technologies**

This qualification has been developed to conform to the requirements of the RQF, to meet the requirements of higher education and employers and to meet the needs of learners.

This qualification aims to provide learners with the underpinning knowledge and understanding of a range of topics within the Information and Digital Technology environment. These topics will allow learners to develop practical and theoretical approaches to solving problems and finding solutions using Information and Digital Technologies.

## **Entry Requirements**

The Level 3 Diplomas within the IAP are designed to meet the needs of learners who are progressing from study at Level 2, as well as those who are returning to learning. This includes those who are seeking to progress to higher education, entering the workforce, including higher level apprenticeships or wishing to progress in their career. Learners may be aged 16/19, who have recently been in education or training, or those aged 19 plus. More mature learners are likely to present a more varied profile of achievement and experience.

ATHE's policy regarding access to our qualifications is that:

- they should be available to everyone who is capable of reaching the required standard
- they should be free from any barriers that restrict access and progression
- there should be equal opportunities for all those wishing to access the qualifications

Centres should review the prior qualifications and experience of each learner and consider whether they provide the necessary foundations to undertake the programme of study at level 3. For learners with disabilities and specific needs, this review will need to take account of the support available to the learner during teaching and assessment of the qualification.

The typical minimum requirements for learners who have recently been in education or training is likely to include one of following:

- 5 or more GCSEs at grades C and above or Grade 4 and above
- other related level 2 subjects
- other equivalent international qualifications.

Learners will need to have appropriate Level 2 standard in English and Mathematics/Numeracy, so they can access resources and complete the unit assignment.

The varied profile of achievement of more mature learners is likely to include relevant work experience (paid and/or unpaid), participation and/or achievement of relevant qualifications. This may be used for recognition of prior learning (RPL). Learners may also hold RQF qualifications which will enable them to claim a credit transfer from part of the qualification. Exemptions from part or all of the qualification may also be available based on detailed and current evidence provided by the learner. For further information please see the ATHE RPL, Credit Transfer and Exemptions Policy, which can be found on the ATHE website.

Learners must also have an appropriate standard of English to enable them to access relevant resources and complete the unit assignments.

For those whom English is not their first language we recommend the following standards of proficiency in English language skills or an approved equivalent for this qualification:

- IELTS 5.5
- Common European Framework of Reference (CEFR) B2
- Cambridge English Advanced (CAE) 162 or above
- Pearson Test of English (PTE) Academic 42-49

Centres are required to recruit learners to qualifications with integrity. Centres must carry out robust initial assessment to ensure that learners, who undertake qualifications, have the necessary background knowledge, understanding and skills to undertake the learning and assessment at Level 3. This assessment should take account of any support available to the learner within the centre during the programme of study and any support that may be required to allow the learner to access the assessment for the units within the qualification.

ATHE will review centre recruitment policies as part of their monitoring processes.

### **Reasonable Adjustments and Special Considerations**

ATHE's policy on reasonable adjustments and special consideration aims to enhance access to the qualifications for learners with disabilities and other difficulties (as defined by the Equality Act 2010) without compromising the assessment of skills, knowledge and understanding. Where the learner has been awarded a Reasonable Adjustment or Special Consideration this must be recorded on the assessment sheet and the learner record. External Quality Assurers will take account of this information at the external quality assurance of learner work. Further details on Reasonable Adjustments and Special Considerations are provided in the policy document, which

can be found on our website. Please contact ATHE if you uncertain about adjustments for certain learners.

## **Support and Recognition**

This qualification has been development in collaboration with subject matter experts and our qualification development team.

## **Progression**

The Information and Digital Technologies qualification is part of the International Access Programme which provides a menu of diploma options to meet individual requirements. The number of diplomas a learner wishes to study, and number of credits required for progression will vary.

Learners may progress to:

- employment or have increased opportunities for progression in their current role
- a higher level ATHE qualification at Level 4 or above, in a related subject
- the first year of a degree programme
- higher level apprenticeships

Typically, learners aged 16 plus who wish to progress to a degree programme with a higher education institute, should consider studying two or three diplomas to total 120 or 180 credits which is considered to meet the general entry requirements to a degree programme at Level 4 (as dependent on HEI entry requirements and the degree programme), and provides exemption to a foundation year programme.

For mature learners aged 19 plus with existing qualifications and experience, wishing to progress within a role, or to a degree programme at Level 4 this could be 120 credits or less. Mature learners may therefore wish to study less than three diplomas.

Learners should seek guidance and check university and programme entry requirements before selecting the individual diplomas they plan to study.

## **ATHE Recognition of Prior Learning (RPL)**

There will be occasions where learners wish to claim recognition of prior learning that has not been formally assessed and accredited. ATHE has provided detailed guidance on RPL which is available for centres on the ATHE website. Centres may also contact ATHE directly to obtain further clarification or discuss the requirements for RPL.

## **Resources Required by Centres**

ATHE expects centres to provide the right human and physical resources needed to ensure the quality of the learner experience. Centres must ensure that staff have the appropriate level of subject knowledge and are normally qualified to at least a degree standard. It is desirable that staff have a teaching and/or assessing qualification and practical experience related to information and digital technologies.

The physical resources required will vary depending on the style of delivery. Where distance or blended learning is used, ATHE expects centres to have appropriate learning support materials, infrastructure and technology in place to meet student needs.

This information will be checked by external quality assurers on their visits to centres.

## Modes of Delivery

Subject to checks by external quality assurers centres can deliver this qualification using the following modes of delivery in order to meet the needs of their learners.

This can include:

- full time
- part-time
- blended learning
- distance learning

## Qualification size

The size of a qualification is expressed in **Total Qualification Time (TQT)**

### Total Qualification Time – TQT

TQT is the total amount of time, in hours, expected to be spent by a student to achieve a qualification.

**TQT is comprised of:**

1. **Guided Learning Hours (GLH)**
2. **Additional non-supervised learning**

### Guided Learning Hours – GLH

This is the amount of time the average student is expected to spend in lectures and other tutor-supervised learning and activities, including induction, face to face training, e-learning with the co-presence of learner and tutor, invigilated exams.

Guided Learning Hours (GLH) are an estimate of the amount of time, on average, that a lecturer, supervisor, tutor or other appropriate provider of education or training, **will immediately guide or supervise** the learner to complete the learning outcomes of a unit to the appropriate standard.

GLH are intended to provide guidance for centres on the amount of time required to deliver the programme and support learners.

### Additional non-supervised learning

This is an estimate of the number of hours a Learner will reasonably be likely to spend in preparation, study or any other form of participation in education or training, including assessment, which takes place as directed by – but, unlike Guided Learning, not under the Immediate Guidance or Supervision of – a lecturer, supervisor, tutor or other appropriate provider of education or training.

These activities may include webinars, podcasts, research, work based learning, private and online study, compilation of a portfolio of evidence and non-invigilated assessment.

### How TQT is calculated

Values for Total Qualification Time, Guided Learning Hours and Credit, are calculated by considering the different activities that a learner would typically complete in order to achieve the learning outcomes of a qualification at the standards provided.

The needs of individual learners and the differing teaching styles used mean there will be variation in the actual time taken to complete a qualification.

Values for Total Qualification Time, Guided Learning Hours and Credit are estimates.

### Credit

Each ATHE qualification has a Credit value. Credit is calculated by dividing the TQT by ten. For example, a qualification with TQT of 120 hours would have a credit value of 12.

### Level

The level is an indication of relative demand, complexity and depth of achievement and autonomy. This qualification has been designed to suit learners working towards a Level 3 qualification. Level descriptors are divided into two categories:



- I. Knowledge and understanding
- II. Skills

There is a knowledge descriptor and a skills descriptor for each Level within the framework. The descriptors set out the generic knowledge and skills associated with the typical holder of a qualification at that Level. The Knowledge and skills for Level 3 are:

| Knowledge descriptor (the holder....)   | Skills descriptor (the holder can....)  |
|---|---|
| <ul style="list-style-type: none"> <li>• Has factual, procedural and theoretical knowledge and understanding of a subject or field of work to complete tasks and address problems that while well-defined, may be complex and non-routine.</li> <li>• Can interpret and evaluate relevant information and ideas.</li> <li>• Is aware of the nature of the area of study or work.</li> <li>• Is aware of different perspectives or approaches within the area of study or work.</li> </ul> | <ul style="list-style-type: none"> <li>• Identify, select and use appropriate cognitive and practical skills, methods and procedures to address problems that while well-defined, may be complex and non-routine.</li> <li>• Use appropriate investigation to inform actions.</li> <li>• Review how effective methods and actions have been.</li> </ul> |

## Rules of Combination

Each qualification has agreed rules of combination which indicates the number of credits to be achieved, the units that are mandatory and the choice of optional units. The rules of combination for this qualification are given below.

## Qualification Structure for the ATHE Level 3 Diploma in Information and Digital Technologies

ATHE Level 3 Diploma in Information and Digital Technologies is a 60-credit qualification.

### Rules of combination

Learners must achieve 7 Mandatory Units.

**The Total Qualification Time is 600**

**The Total Guided Learning Hours is 360**

**The Total Credit value is 60**

| Unit Codes | Unit Title                                     | Level | Credit | GLH |
|------------|--|-------|--------|-----|
|            | <b>Mandatory Units</b>                         |       |        |     |
| A/618/4173 | Introduction to Computer Programming           | 3     | 10     | 60  |
| F/618/4174 | Introduction to Computing Mathematics          | 3     | 10     | 60  |
| J/618/4175 | Introduction to Cyber Security                 | 3     | 10     | 60  |
| L/618/4176 | Introduction to Digital Technologies           | 3     | 5      | 30  |
| R/618/4177 | Introduction to Emerging Technologies          | 3     | 5      | 30  |
| Y/618/4178 | Introduction to Mobile Application Development | 3     | 10     | 60  |
| D/618/4179 | Introduction to Web Development                | 3     | 10     | 60  |

## Guidance on Assessment and Grading

### Assessment

Assessment for each unit is completed based on achievement of the Learning Outcomes at the standards set by the Assessment Criteria for that unit. The learner can therefore achieve a Pass, Merit, Distinction or Fail for each unit based on the quality of the work submitted and the assessor's judgements made against the criteria provided.

The assessment of the ATHE Level 3 Diploma in Information and Digital Technologies is completed through the submission of internally assessed learner work. This work is subject to external moderation or verification.

To achieve a pass for a unit, a learner must have successfully achieved the learning outcomes at the pass standard set by the assessment criteria for that unit. To achieve merit or distinction, the learner must demonstrate that they have achieved the criteria set for these grades. Learners cannot omit completing work to meet the pass standard and simply work to the higher grades, as this would put a pass for the unit in jeopardy. Similarly, learners cannot complete work to meet the criteria for distinction in the anticipation that this will also meet the criteria for merit. However, where work for the pass standard is marginal, assessors can take into account any extension work completed as this may support achievement of the pass standard.

In undertaking their work and completing the set assignments, learners will demonstrate understanding of concepts, theories and knowledge, together with the application of study and practical skills. Learners will use learning synoptically from across the separate units in this Diploma and this will lead to synoptic assessment.

ATHE will provide a sample assignment which can be used as the assessment vehicle. This assignment includes extension activities, which enable the learners to provide additional evidence to show that the criteria for the higher grades have been met. The assessor therefore must judge the grade for the work submitted on the basis of whether the LO has been met at the standard, specified for the pass, merit or distinction grade for that LO. In making their judgements assessors will continue to check whether the command verbs stated in the AC have been delivered. There is no requirement for learners to produce the additional work required for the higher grades and the tutor may advise the learner to work to the pass standard, where this is appropriate.

The assessor should record their judgements on the ATHE template, stating what grade the learner has achieved and providing evidence for the judgements. The internal verifier can also use the ATHE IV template but the feedback to the assessor must show whether the assessor has made valid judgements for all the learner work, including any extension activities which met the standard for merit and distinction grades. Assessment is therefore more complex. Assessment judgements always require care to ensure that they are reliable and that there is sufficient and specific feedback to the learner to show whether he or she has demonstrated achievement of the LO at the specified standard. The additional grades mean that assessors must take even greater care to assure the validity of their judgements.

We would encourage our centres to develop their own assessment strategies, so you have the opportunity to put assignments in a context that is appropriate for your learners. Any assignments that you devise independently will need to be submitted to ATHE for approval before delivery of the programme. Centres can submit assignments for approval using the 'Centre-Devised Assignment' template documentation available on the ATHE website.

An assignment can relate to a single unit or an integrated assignment, incorporating more than one unit. An integrated assignment must show which learning outcomes and assessment criteria from which units are being covered.

## **Methods of Assessment**

ATHE encourages centres to use a range of assessment vehicles that will engage learners and give them an opportunity to both demonstrate their knowledge and understanding of a topic and to evaluate how they might apply that knowledge in a given context. This should be part of the assessment strategy.

We would recommend varied types of assessment are included. This might include assessment through:

- a research activity resulting in the compilation of a report
- an academic paper or article for publication
- the compilation of a case study
- a critical review and evaluation of a chosen company's policies, procedures and systems
- a set project completed for an employer (also known as an 'employer-engagement' activity)
- the production of a portfolio of evidence relating to a particular unit.

This list is by no means exhaustive but gives examples of some creative assessment methods that could be adopted.

## **Recording Assessment Judgements**

Assessors are required to record assessment judgements for each student by unit. ATHE has provided a template for centres to use to record their judgements and this form should be used. The

form enables the centre to record any adjustments due to special considerations or reasonable adjustments. Any adjustments following appeals should also be recorded. These records must be retained as they will be checked at external quality assurance visits. All learner work must be retained for a minimum of 4 years after certification has taken place.

## **Putting an Assessment Strategy in Place**

You will need to demonstrate to your External Quality Assurer that you have a clear assessment strategy supported by robust quality assurance in order to meet the ATHE requirements for registering learners for a qualification. In devising your assessment strategy, you will need to ensure that:

- Centre devised assignments are clearly mapped to the unit learning outcomes and assessment criteria they have been designed to meet.
- the command verbs used in the assignment are appropriate for the level of the qualification, e.g. analyse, evaluate, synthesise.
- the assignment gives the learner sufficient opportunity to meet the assessment criteria at the right level, through the work they are asked to complete (The RQF level descriptors will be helpful to you in determining the level of content of the assessment).
- Learners are well-briefed on the requirements of the unit and what they must do to meet them.
- Assessors are well trained and familiar with the content of the unit/s they are assessing.
- There is an internal verification process in place to ensure consistency and standardisation of assessment across the qualification.
- Assessment decisions are clearly explained and justified through the provision of feedback to the learner.
- work submitted can be authenticated as the learner's own work and that there is clear guidance and implementation of the centres Malpractice Policy.
- there is an assessment plan in place identifying dates for summative assessment of each unit and indicating when external quality assurance will be needed.
- Enough time is included in the assessment planning to allow the learners time for any necessary remedial work that may be needed prior to certification.

## **Grading**

### **Grading system**

The grading algorithms and overall grade thresholds published in any ATHE specification may be subject to change where this is necessary to maintain standards.

Given that this qualification involves assessment using judgements against 'Pass', 'Merit' and Distinction Assessment Criteria to make a decision about whether a learner has met the required standard, our grading system is straightforward and we do not currently envisage the need to change this.. However, should a change become necessary, the change would be published in an updated version of the specification with a clearly revised version number and a new 'valid from' date on the front cover. We will write to all centres in good time to inform them of this change so that plans for any changes can be made to your programme delivery, internal assessment and quality assurance arrangements.

The ATHE grading system where a qualification result can be Pass, Merit, Distinction or Fail is as currently follows and we plan to maintain this system for the foreseeable future:

- Learner meets all Learning Outcomes at Pass standards stated in the assessment criteria in a unit > Learner gains a Pass for the unit

- Learner meets all Learning Outcomes at Pass standards, and where available also at Merit standards stated in the assessment criteria in a unit > Learner gains a Merit for the unit
- Learner meets all Learning Outcomes at Pass standards, and where available also at Merit and Distinction standards stated in the assessment criteria in a unit > Learner gains a Distinction for the unit
- Learner does not meet all Learning Outcomes at Pass standards stated in the assessment criteria in a unit > Learner is given a Fail for the unit
- Learner meets the rules of combination in a qualification and points for achieving units are added up > points are converted to an overall qualification grade > learner meets minimum number of points required > learner achieves a Pass, Merit or Distinction for the qualification
- Learner does not meet the rules of combination in a qualification and/or points for achieving units are added up > points are converted to an overall qualification grade > learner does not meet rules of combination or minimum number of points required > learner is given a Fail for the qualification but may receive unit certification for those units achieving a Pass.

### **Qualification Grading Structure**

Each unit is graded pass, merit or distinction. As well as receiving a grade for each individual unit learners will receive an overall grade for the qualification. The formula for establishing the overall grade is as follows.

For the Level 3 Diploma in Information and Digital Technologies, points for each unit achieved are as follows:

- Pass (achieves Learning Outcomes at the standards stated in pass assessment criteria) – The credit value multiplied by 3
- Merit (achieves Learning Outcomes at the standards stated in pass and all merit assessment criteria) – The credit value multiplied by 4
- Distinction (achieves Learning Outcomes at the standards stated in pass, all merit and all distinction Assessment Criteria) – The credit value multiplied by 5

Total points required for each qualification grade:

- Pass 180 – 215
- Merit 216 – 269
- Distinction 270+

### **Quality Assurance of Centres**

Centres delivering ATHE qualifications must be committed to ensuring the quality of teaching and learning so that the learner experience is assured. Quality assurance will include a range of processes as determined by the centre and this could include, gathering learner feedback, lesson observation, analysis of qualitative and quantitative data etc. There must also be effective standardisation of assessors and verification of assessor decisions. ATHE will rigorously monitor the application of quality assurance processes in centres.

ATHE's quality assurance processes will include:

- Centre approval for those centres which are not already recognised to deliver ATHE RQF qualifications
- Monitoring visits to ensure the centre continues to work to the required standards
- External quality assurance of learner work

Centres will be required to undertake training, internal verification and standardisation activities as agreed with ATHE. Details of ATHE's quality assurance processes are provided in the ATHE Guide: "Delivering ATHE Qualifications" which is available on our website.

## Malpractice

Centres must have a robust Malpractice Policy in place, with a clear procedure for implementation. Centres must ensure that any work submitted for quality assurance can be authenticated as the learner's own. Any instance of plagiarism detected by the External Quality Assurer during sampling, will be investigated and could lead to sanctions against the centre.

Centres should refer to the Delivering ATHE Qualifications Guide and the ATHE Malpractice and Maladministration Policy on the ATHE website.

## Guidance for Teaching and Learning

Learners learn best when they are actively involved in the learning process. We would encourage practitioners delivering our qualifications to use a range of teaching methods and classroom-based activities to help them get information across and keep learners engaged in the topics they are studying. Learners should be encouraged to take responsibility for their learning and need to be able to demonstrate a high degree of independence in applying the skills of research and evaluation. You can facilitate this by using engaging methods of delivery that involve active learning rather than relying on traditional methods of lecture delivery to impart knowledge.

Your approach to delivery should give the learners enough structure and information on which to build without you doing the work for them. In achieving the right balance, you will need to produce well-planned sessions that follow a logical sequence and build on the knowledge, understanding and skills already gained.

## Top Tips for Delivery

- Adopt a range of teaching and learning methods, including active learning.
- Plan sessions well to ensure a logical sequence of skills development.
- Include study skills aspects, e.g. how to construct a report or Harvard Referencing. Build time into your Scheme of Work and Session Plans to integrate study skills teaching.
- Set structured additional reading and homework tasks to be discussed in class.
- Elicit feedback from your students. Get them to identify where the work they have done meets the assessment criteria.
- Contextualise your activities, e.g. using real case studies as a theme through the sessions.
- Use learner experience from the workplace or other personal learning
- Take an integrated approach to teaching topics across units, where appropriate, rather than always taking a unit-by-unit approach. In this way, learners will be able to see the links between the content of the different units.

There is further guidance on teaching and learning in the support materials.

## **Unit Specifications**

### Unit Format

Each unit in ATHE's suite of qualifications is presented in a standard format. This format provides guidance on the requirements of the unit for learners, tutors, assessors and external quality assurers.

Each unit has the following sections:

### Unit Title

The unit title reflects the content of the unit. The title of each unit completed will appear on a learner's statement of results.

### Unit Aims

The unit aims section summarises the content of the unit.

### Unit Code

Each unit is assigned an RQF unit code that appears with the unit title on the Register of Regulated Qualifications.

### RQF Level

All units and qualifications in the RQF have a level assigned to them which represents the level of achievement. The level of each unit is informed by the RQF level descriptors. The RQF level descriptors are available on the ATHE website.

### Credit Value

The credit value is the number of credits that may be awarded to a learner for the successful achievement of the learning outcomes of a unit.

### Guided Learning Hours (GLH)

Guided learning hours are an estimate of the amount of time, on average, that a tutor, trainer, workshop facilitator etc., will work with a learner, to enable the learner to complete the learning outcomes of a unit to the appropriate standard.

### Learning Outcomes

The learning outcomes set out what a learner is expected to know, understand or be able to do as the result of the learning process.

### Assessment Criteria

The assessment criteria describe the requirements a learner is expected to meet in order to demonstrate that the learning outcome has been achieved. Command verbs reflect the level of the qualification e.g. at Level 5 you would see words such as analyse and evaluate

### Unit Indicative Content

The unit indicative content section provides details of the range of subject material for the programme of learning for the unit.

| <b>Introduction to Computer Programming</b>               |   |   |   |
|---|---|---|---|
| <b>Unit aims</b>  | This unit aims to provide learners with fundamentals of computer programming. Learners will develop their knowledge and understanding by investigating the range of languages available, example uses and the similarities across different languages.  |   |   |
| <b>Unit level</b>   | 3   |   |   |
| <b>Unit code</b>  | A/618/4173  |   |   |
| <b>GLH</b>  | 60  |   |   |
| <b>Credit value</b>                                       | 10  |   |   |
| <b>Unit grading structure</b>                             | Pass, Merit and Distinction   |   |   |
| <b>Assessment guidance</b>                                | In order to achieve this unit, learners must produce work which demonstrates achievement of the learning outcomes at the standards provided by the assessment criteria and the completion of assignments in accordance with awarding organisation guidance.   |   |   |
| <b>Learning outcomes<br/>The learner will:</b>            | <b>Assessment criteria<br/>The learner can:</b>   |   |   |
|   | Pass  | Merit   | Distinction   |
| 1. Understand how computer programming languages are used | 1.1 Describe how computer programming languages are used to meet business needs<br>1.2 Explain how computer programming languages are used in different industries<br>1.3 Explain the requirements for developing computer programming code   | 1M1<br>Analyse the sources of assistance to use when developing computer programming code | 1D1<br>Evaluate the importance of programming languages in the Manufacturing industry |
| 2. Understand the basics of programming languages         | 2.1 Explain the features of programming environment(s)<br>2.2 Explain the range of data types used in programming<br>2.3 Explain the use of: <ul style="list-style-type: none"> <li>- variables in programming</li> <li>- keywords in programming</li> <li>- Logical and Arithmetical Operators</li> <li>- conditions in programming</li> <li>- loops in programming</li> </ul> 2.4 Explain numbers, characters and arrays<br>2.5 Explain functions and methods used in |   |   |



|  |   |  |  |
|--|---|--|--|
|  | programming<br>2.6 Explain input and output operations  |  |  |
| 3. Understand programming languages                        | 3.1 Explain the characteristics of different programming languages<br>3.2 Explain the common similarities between programming languages<br>3.3 Identify the most suitable programming language to use   | 3M1<br>Explain the advantages and disadvantages of programming languages | 3D1<br>Assess programming code and the problem the code is solving                             |
| 4. Understand the use of Object Oriented Programming (OOP) | 4.1 Explain the characteristics of Object Oriented Programming (OOP)<br>4.2 Describe the advantages of using Object Oriented Programming (OOP)<br>4.3 Explain encapsulation in Object Oriented Programming (OOP)<br>4.4 Explain inheritance in Object Oriented Programming (OOP)<br>4.5 Explain polymorphism in Object Oriented Programming (OOP) |  |  |
| 5. Be able to write a basic computer programme             | 5.1 Identify a problem to solve using a computer programme<br>5.2 Write a basic code sequence to solve a problem<br>5.3 Explain the code using comments<br>5.4 Create a test plan and carry out testing on the computer programme using a test plan<br>5.5 Review and evaluate the programme  | 5M1<br>Use a range of programming functions in a computer programme      | 5D1<br>Use a range of functions which provide additional functionality in a computer programme |

## Indicative Content

### 1 Understand how computer programming languages are used

- Learners should understand how computer programming is used with real life examples of how computer programming supports efficiencies in manufacturing, production and engineering.
- Requirements include suitable Ide (Integrated Development Environment) which is software that combines common developer tools into a single graphical user interface (GUI).
- Sources of assistance could include online forums, online blogs, tutors, working groups, code responsivities etc.

### 2 Understand the basics of programming languages

- Features of a programming environment should include:
  - Syntax/error highlighting
  - Code completion
  - Refactoring
  - Version control
  - Debugging options
  - Code search, find and locate
  - Visual programming
  - Language support provided
- Data types should include:
  - String (or str or text)
  - Character (or char)
  - Integer (or int)
  - Float (or Real)
  - Boolean (or bool)
- Variables: To label and store data in memory to be used throughout the programme. Learners should be able to understand the difference between variables and constants.
- Keywords: Learners should know the importance of understanding that some keywords cannot be used and are 'reserved keywords' which will vary between programming language, for example 'PRINT, INPUT'.
- Logical and Arithmetical Operators: arithmetical operators work with numbers (e.g., integers, floats) while logical operators work with Boolean values (true, false)
- Conditions in programming (conditional statements):
  - If statement
  - If-Else statement
  - Nested If-else statement
  - Switch statement
- Explain the use of loops in programming:
  - Entry controlled loop
  - Exit controlled loop
  - While
  - Do while
  - For
- Numbers, Characters and Arrays:
  - Int
  - Char
  - Double

- Declaring array and assigning values
- Print
- Functions and methods:
  - Set method
  - Get method
  - Print
  - Main
- Input and Output Operations:
  - Single character input and output
  - String input and output

### **3 Understand a range of programming languages**

- Characteristics of programming languages:
  - Easy to read and recognizable by humans
  - Efficient and able to solve problems
  - Saleable and can input/reference other elements of code or calculations
  - Structured and documented
  - Accessible within an IDE
  - Consistent in terms of syntax
  - Abstraction
- Common similarities include, but not limited to:
  - Following set rules and processes
  - Allowing Input and output
  - Statements
  - Variables
  - Declarations
- Learners should be able to identify the most suitable programming language to use based on the resources available, the systems being used (compatibility) and the extend of the problem they are trying to solve.

### **4 Understand the use of Object Oriented Programming (OOP)**

- Characteristics should include, but not limited to:
  - Emphasis on data rather than procedure
  - Data structures are designed using objects
  - Code can be reused
  - Data is hidden and cannot be accessed by external functions therefore increased security
  - Additional data and functions can be easily added
- Advantages should include, but not limited to:
  - Code is modular and therefore can improve troubleshooting, i.e. easier to locate errors in code
  - Code can be reused through inheritance
  - Greater flexibility through polymorphism
  - Effective problem solving through a natural approach

**5 Be able to write a basic computer programme**

- Learners should select an appropriate level of problem to solve which will allow them to develop a solution using computer programming. The problem should be realistic and achievable.
- The code written by the learners should follow code guidelines and good practise. The code should be clearly presented and have clear comments explaining the use of any functions.
- Learners should test the solution fully to ensure it is fit for purpose and fully able to solve the problem.

| <b>Introduction to Computing Mathematics</b>                         |   |  |   |
|--|---|--|---|
| <b>Unit aims</b>   | This units aims to provide an overview of the mathematical skills required for computer programming. Learners will develop knowledge and understanding in the areas of mathematics that are used when working with a computing programming language.  |  |   |
| <b>Unit level</b>  | 3   |  |   |
| <b>Unit code</b>   | F/618/4174  |  |   |
| <b>GLH</b>   | 60  |  |   |
| <b>Credit value</b>  | 10  |  |   |
| <b>Unit grading structure</b>  | Pass, Merit and Distinction   |  |   |
| <b>Assessment guidance</b>   | In order to achieve this unit, learners must produce work which demonstrates achievement of the learning outcomes at the standards provided by the assessment criteria and the completion of assignments in accordance with awarding organisation guidance.   |  |   |
| <b>Learning outcomes<br/>The learner will:</b>                       | <b>Assessment criteria<br/>The learner can:</b>   |  |   |
|  | Pass  | Merit  | Distinction   |
| 1. Understand the relevance of mathematics in computing              | 1.1 Explain how mathematics is used in computing<br>1.2 Describe the types of mathematics used for computer programming   | 1M1<br>Assess the benefits of mathematics in computing           | 1D1<br>Evaluate the importance of understanding mathematics for computing |
| 2. Understand problem solving techniques using computing mathematics | 2.1 Describe approaches to problem solving<br>2.2 Explain the following terms: <ul style="list-style-type: none"> <li>variable</li> <li>constant</li> <li>causal factor paths</li> </ul> 2.3 Carry out a root cause analysis<br>2.4 Use problem solving techniques to solve a for a range of computing problems | 2M1<br>Assess how constants and variables affect data statistics |   |

|  |  |  |  |
|--|--|--|--|
| <p>3. Understand basic mathematical formulas for computing mathematics</p> | <p>3.1 Explain the use of the following within formulas:</p> <ul style="list-style-type: none"> <li>• addition</li> <li>• subtraction, multiplication</li> <li>• division</li> </ul> <p>3.2 Explain the functions and equations used for calculations</p> <p>3.3 Use algebra to solve computing equations</p>                                  |  |  |
| <p>4. Understand mathematical logic</p>                                    | <p>4.1 Describe how mathematical logic is used for computing</p> <p>4.2 Explain how Boolean logic is used</p> <p>4.3 Explain the logic gates used in calculations</p> <p>4.4 Describe arithmetic and relational operators</p> <p>4.5 Describe the use of truth tables</p> <p>4.6 Perform simple calculations and apply logical expressions</p> | <p>4M1<br/>Use mathematical logic techniques to make informed decisions based on data analysis</p> | <p>4D1<br/>Use truth tables to solve Boolean statements</p>  |
| <p>5. Understand probability in mathematics</p>                            | <p>5.1 Explain probability theory and concepts</p> <p>5.2 Explain probability formulas used for computing</p> <p>5.3 Calculate the probability of an event occurring using an example</p>  |  |  |
| <p>6. Understand binary mathematics</p>                                    | <p>6.1 Explain how binary is used in computing</p> <p>6.2 Convert decimal numbers into binary numbers</p> <p>6.3 Explain how hexadecimal numbers are used</p>  | <p>6M1<br/>Analyse the difference between binary, decimal and hexadecimal numbers</p>              | <p>6D1<br/>Convert hexadecimal numbers to binary numbers</p> |

## Indicative Content

### 1 Understand the relevance of mathematics in computing

- Mathematics is important for engineering and science, a foundation in logic, critical-thinking and abstract mathematics. It will provide learners with the skills of reading, understanding and analysing a problem before deciding on a solution
- Types of mathematics include discrete mathematics

### 2 Understand problem solving techniques using computing mathematics

- Techniques include Read, Choose, Solve and Check. Learners should develop a generic ability to solve real life problems and apply mathematics in real life situations i.e. computing situations.
- Learners should be familiar with identifying a variable and constant, examples of these in real life situations and how these affect data analysis/trend analyses.
- Learners should understand the importance of considering causal factor paths and how they would affect data outcomes
- Learners should be able to use a root cause analysis approach to solve a problem. For example, The Problem, The Evidence, The Factors, The Strategy and Alternative Strategies.

### 3 Understand basic mathematics formulas for computing mathematics

- Learners should be able to include Addition, subtraction, multiplication, and division within formulas appropriately and use the correct
- Functions and equations should include the use of sets, subsets and how X and Y are relational within these elements
- Learners should be familiar with the following elements of algebra:
  - Numbers including Integers and Decimals
  - Expressions
  - Equations
  - Operators
  - Factor

### 4 Understand mathematical logic

- Boolean logic and logic gates including AND, OR, NAND (Not AND), NOR (Not OR), XOR (Exclusive OR) XNOR (Exclusive NOR) and NOT.
- Learners should understand that arithmetic operators are used to perform mathematical operations. Relational operators are used to perform comparison operations.
- Learners should understand the purpose of truth tables and be able to use a truth table to decide if a statement is true or false.
- Learners should be able to use their knowledge and perform calculations applying the logical expression to solve the problem.

### 5 Understand probability in mathematics

- Independence, conditional probability
- Random variables, moments and deviation
- Learners should be able to calculate the probability of an event occurring based on the information available. This should be linked back to a computing event.

### **6 Understand binary in mathematics**

- Learners should understand the importance of 0 and 1's in computing and how these can be converted. Learners should be shown real life examples of the numbers being used.
- Learners should be able to example how hexadecimal numbers and used and identify/construct a hexadecimal number



| <b>Introduction to Cyber Security</b>                                  |   |   |  |
|--|---|---|--|
| <b>Unit aims</b>   | This unit aims to provide an overview of cyber security and the importance of keeping yourself and systems safe when online. Learners will develop an understanding of the basics of security and the appropriate measures to take to reduce security risks.  |   |  |
| <b>Unit level</b>  | 3   |   |  |
| <b>Unit code</b>   | J/618/4175  |   |  |
| <b>GLH</b>   | 60  |   |  |
| <b>Credit value</b>  | 10  |   |  |
| <b>Unit grading structure</b>  | Pass, Merit and Distinction   |   |  |
| <b>Assessment guidance</b>   | In order to achieve this unit, learners must produce work which demonstrates achievement of the learning outcomes at the standards provided by the assessment criteria and the completion of assignments in accordance with awarding organisation guidance.   |   |  |
| <b>Learning outcomes<br/>The learner will:</b>                         | <b>Assessment criteria<br/>The learner can:</b>   |   |  |
|  | Pass  | Merit   | Distinction  |
| 1. Understand the use of cyber security                                | 1.1 Explain the importance of understanding cyber security<br>1.2 Describe how to keep up to date with new security attacks<br>1.3 Describe the typical mind-sets of hackers<br>1.4 Outline the different types of malware that exist<br>1.5 Describe the different types of cyber-attacks that exist | 1M1<br>Explain the advantages of understanding hacker's mind-sets | 1D1<br>Evaluate a range of security attacks and identify areas for improvement |
| 2. Understand how to keep yourself and others safe when working online | 2.1 Explain methods of keeping safe when using social networks<br>2.2 Describe how social networks create your personal brand<br>2.3 Explain how to protect your reputation online<br>2.4 Explain methods of keeping safe when working online   |   |  |

|   |  |   |  |
|---|--|---|--|
| <p>3. Understand appropriate security measures to implement</p>       | <p>3.1 Explain the types of cyber-attacks to look out for<br/>3.2 Identify legislation relating to cyber security<br/>3.3 Outline policies that could be implemented in a chosen work environment<br/>3.4 Explain effective prevention methods<br/>3.5 Describe how to protect systems, people and processes</p> |   |  |
| <p>4. Understand how to manage cyber security risks</p>               | <p>4.1 Identify risk management techniques<br/>4.2 Create a cyber security risk register<br/>4.3 Explain how to monitor cyber security risks<br/>4.4 Create a risk response plan<br/>4.5 Describe the importance of cyber security when designing a new system<br/>4.6 Create a disaster recovery plan</p>       | <p>4M1<br/>Explain the benefits of having a risk register</p> | <p>4D1<br/>Evaluate the impact that a preventive measure would have on a potential risk</p>          |
| <p>5 Be able to Implement security measures on a range of devices</p> | <p>5.1 Install and configure security measures on mobile devices<br/>5.2 Install and configure security measures on desktop based devices<br/>5.3 Install and configure security measures on cloud based systems</p>   | <p>5M1<br/>Configure security policies to protect devices</p> | <p>5D1<br/>Assess the benefits of centrally managing and controlling devices for an organisation</p> |

## Indicative Content

### 1 Understand the basics of cyber security

- Importance of understanding Cyber Security includes, but not limited to:
  - To be able to protect yourself and your organisation from any online attacks
  - In order to protect information such as sensitive data, personally identifiable information, health information and personal information.
  - To comply with GDPR regulations
  - Cyber Security attacks are continuing to grow and therefore measures to prevent attacks need to be increased
- Legislation could include, but not limited to:
  - Harassment Act
  - Communications Act
  - General Data Protection Regulations

- Keeping up to date with new security attacks can include, but not limited to:
  - Subscribing to online forums and blogs relating to security
  - Join professional social networks platforms
  - Subscribe to relevant newsletter
  - Review software providers updates/release notes
  - News outlets
- Understanding the mind-sets of hackers will allow learners to develop a knowledge of reasons why hackers perform attacks, i.e. personal gain, money reasons, political agenda, passion for hacking etc.
- Types of malware can include, but not limited to:
  - Worms
  - Viruses
  - Bots
  - Trojan Horses
  - Ransomware
  - Adware & Scams
  - Spyware
  - Spam & Phishing
- Types of cyber-attacks include, but not limited to:
  - Denial-of-service (DoS) Attacks
  - Man-in-the-middle (MitM) Attack
  - Phishing Attacks
  - Malware
  - SQL Injection Attack
  - Password Attack

## **2 Understand how to keep yourself and others safe when working online**

- Keeping safe when using Social Networks:
  - Switch profile to private mode
  - Use a strong password
  - Do not accept friend requests from strangers
  - Consider content before uploading such as text and photographs
  - Do not disclose personal information
  - Ensure devices used to access the networks have protection
- Personal brand: Having social network accounts create an online identity for you, it is important to consider how this creates a personal brand for you and how this could be a negative image depending on the content posted on your channels.
  - Considerations:
    - Consider what you want to be known for
    - Define your audience
    - Research your industry and follow the industry experts
    - Embrace and build a network
    - Ask for recommendations
- Protect your reputation online:
  - Conduct an online search of your name and review all content that is displayed
  - Setup alerts to be informed when new content with your name is published
  - Do not allow people to tag you in images that may damage your reputation
  - Think before your post content and if the content could cause offence or damage your reputation
- Methods of keeping safe when working online:
  - Using own initiative before posting any content
  - Do not share details such as your bank details unless the website is secure

- Ensuring passwords are not automatically saved for accounts
- Setup two factor authentication on all accounts
- Checking that the website you are using is secure (SSL certificate and padlock)

### **3 Understand appropriate security measures to implement**

- Types of cyber-attacks to look out for
- Policies that could be implemented:
  - Password policy
  - Acceptable use of IT policy
  - Mobile Device Policy
  - Use of Email Policy
  - Network Backup Policy
  - Business Continuity
  - GDPR/Data Protection Policy
  - Privacy Policy
  - Bring your own device policy
- Prevention methods could include, but not limited to:
  - Coaching and mentoring
  - Physical security
  - Software security
  - Changing default passwords on computers and devices
  - Network infrastructure and components such as switches, routers, firewalls etc.
- Protecting systems, people and processes could include, but not limited to:
  - Training for staff in terms of awareness
  - Simulated attacks on the network to test robustness
  - Policies
  - Accreditations
  - Detection
  - Audits
  - Suitable software
  - Visibility of data transfers on networks
  - Managed devices
  - Secure Wi-Fi
  - Backups enabled on site and off site
  - Up to date software

### **4 Understand how to manage cyber security risks**

- Risk management techniques
  - Identify the risk
  - Analyse the risk
  - Evaluate the risk
  - Treat the risk
  - Monitor the risk
  - Avoidance
  - Reduction
  - Sharing
- Risk register could include:
  - Risk ID

- Date raised
- Description
- Likelihood of harm
- Impact
- Severity
- RAG Rating
- Mitigating method
- Monitoring cyber security risks, could include but not limited to:
  - Review the risk register on a regular basis and update
  - Enable daily checks (audits) on appropriate systems
  - Ensure software definitions are always up to date
  - Setup automatic notifications
- The risk response plan should detail the methods used if the risk should increase for example from a Low Risk to a High Risk. This could include the extra measures and actions that would be put in place.
- Cyber security when designing a new system is vital as security should be considered first in relation to any new system decisions. This security first approach means that aspects of security are considered from the beginning of the project. This would usually be documented by carrying out a Data Protection Impact Assessment (DPIA).
- Disaster recovery plan includes:
  - Mitigation, preparedness, response, and recovery details
  - Who had the authority to enact the Disaster Recovery Plan?
  - Details on the critical applications, documents, and resources.
  - Details on the backup and off-site storage in place
  - Details on how often the plan is tested

## **5 Implement security measures on a range of devices**

Security measures could include, but not limited to:

- Mobile devices: Secure Passwords, Two Factor Authentication, Secure Wi-Fi, Device Management Software,
- Desktop based devices: Anti-Virus with updated virus definitions, Malware Software, Firewall, Two Factor Authentication, Device Control Software
- Cloud based systems: Password Policy, Two Factor Authentication, Disable Auto Sign in

| <b>Introduction to Digital Technologies</b>             |   |   |  |
|---|---|---|--|
| <b>Unit aims</b>  | This units aims to provide an overview of the range of digital technologies available across different business sectors and environments. Learners will investigate the different areas and develop knowledge and understanding about the importance of digital technologies in today's world.          |   |  |
| <b>Unit level</b>                                       | 3   |   |  |
| <b>Unit code</b>  | L/618/4176  |   |  |
| <b>GLH</b>  | 30  |   |  |
| <b>Credit value</b>                                     | 5   |   |  |
| <b>Unit grading structure</b>                           | Pass, Merit and Distinction   |   |  |
| <b>Assessment guidance</b>                              | In order to achieve this unit, learners must produce work which demonstrates achievement of the learning outcomes at the standards provided by the assessment criteria and the completion of assignments in accordance with awarding organisation guidance.   |   |  |
| <b>Learning outcomes<br/>The learner will:</b>          | <b>Assessment criteria<br/>The learner can:</b>   |   |  |
|   | Pass  | Merit   | Distinction  |
| 1. Understand the evolution of computing and technology | 1.1 Explain the recent technological advances in computing<br>1.2 Explain the range of information and communications technology (ICT)related jobs available<br>1.3 Explain the transferrable skills learnt from personal computing<br>1.4 Interpret a problem and find an appropriate digital solution |   |  |
| 2. Understand the components of a digital environment   | 2.1 Outline types of hardware solutions used<br>2.2 Outline types of software solutions used<br>2.3 Describe types of networks available<br>2.4 Assess advanced digital solutions   | 2M1<br>Explain the benefits of using a network infrastructure | 2D1<br>Evaluate the impact that hardware has on software |

|   |  |   |  |
|---|--|---|--|
| 3. Understand cloud based (internet) technologies         | 3.1 Describe the different types of cloud based technologies<br>3.2 Explain the benefits of cloud based technologies<br>3.3 Assess the risks of using cloud based technologies<br>3.4 Explain security measures for using cloud based technology |   |  |
| 4. Understand the importance of technology in society     | 4.1 Outline the use of technology in:<br>- Business<br>- Education<br>- Finance<br>- Manufacturing<br>- Health<br>- Medical<br>- Marketing   | 4M1 Explain the benefits of using technology for business processes                         | 4D1 Analyse the impact that technology has had across industry sectors |
| 5. Understand the implementation of new digital solutions | 5.1 Outline the ICT project management process<br>5.2 Outline the development process<br>5.3 Explain the importance of production planning<br>5.4 Describe how hardware and software are co-dependant<br>5.5 Explain the use of programming      | 5M1 Explain the range of project management tools that can be used to manage an ICT project | 5D1 Analyse how a successful digital solution can be deployed          |

## Indicative Content

### 1 Understand the evolution of computing and technology

- Technological advances over the last decade
- The range of jobs including the specific areas of computing such as data analytics, project management, programming/coding, security, networking, engineering,
- A lot of young people are attracted by learning to create games as it is well paid but there is a serious application of transferring skills from gaming to reality. e.g. controlling prosthetic limbs, carrying out surgery in the hospital theatre
- Problem solving techniques
- Examples of digital solutions to solve problems for example, process improvements, automation etc.

## **2 Understand the key components of a digital environment**

- Types of hardware including mobile/hand held devices, desktop based devices, storage devices, backup methods servers, network devices such as switches, routers and hubs
- Types of software including office based software i.e. word processing, spreadsheet, presentation, bespoke software such as CRM
- Types of networks available including network topologies, network connection methods
- Assess advanced digital solutions that are available such as CAD/CAM

## **3 Understand cloud based (internet) technologies**

- Cloud based technologies include cloud storage, cloud software such as online word processing software and cloud infrastructure such as online active directory (Software as a Service)
- Benefits should include benefits to the business in terms of cost reductions, greater efficiency's etc. and the benefit to the user, i.e. access files from any location
- Risks should include security risks, potential hacking and the consequences, reliance on internet connection etc.
- Security measures should include Anti-Virus, Malware protection, firewall, secure password combination, password policy, two factor authentications

## **4 Understand the importance of technology in society**

- Technology in education should include e-learning, VLE, LMS, remote learning, blended learning, types of digital interactive content and how this is possible using a range of software
- Technology in business should include financial accounting software, office packages, CRMs and bespoke software
- Technology in manufacturing should include ERP, automated processes, time management systems, warehouse control software etc.
- Technology in health and medical should include digital machinery for diagnostics, automatic alerts for patient observations (heart rate, blood pressure etc.), digital thermometer, digital patient records such as X-Rays.
- Technology in marketing for automated e-newsletters, CRM, social media campaign's and monitoring, targeted adverting, digital adverts, SEO

## **5 Understand the implementation of new digital solutions**

- Project Management should include project management tools, details within a project plan such as milestones, deadlines, deliverables and responsibilities, contracts, SLA, stages within a project including initiation, planning, implementation, feedback
- Development process should include the stages, requirements, design, implementation, testing, deployment
- Learners should understand the real-life importance of planning a production and the potential consequences for a production without planning i.e. cost overspend, project not completed, project withdrawn, incorrect requirements for users etc.
- Learners should understand how hardware and software work together to provide a digital solution i.e. the software is stored on the hardware and the hardware is the physical element of the solution but all processes are controlled using the software
- Learners should be aware of how programming is used in a digital solution and where the programming code would be stored



| <b>Introduction to Emerging Technologies</b>                                |  |   |  |
|---|--|---|--|
| <b>Unit aims</b>  | This unit aims to provide learners with the necessary knowledge and understanding in order to investigate emerging technologies that are available and those that could be available in the future. Learners will also develop essential academic and research skills and to be able to formally present academic research findings, written and orally. |   |  |
| <b>Unit level</b>   | 3  |   |  |
| <b>Unit code</b>  | R/618/4177   |   |  |
| <b>GLH</b>  | 30   |   |  |
| <b>Credit value</b>   | 5  |   |  |
| <b>Unit grading structure</b>   | Pass, Merit and Distinction  |   |  |
| <b>Assessment guidance</b>  | In order to achieve this unit, learners must produce work which demonstrates achievement of the learning outcomes at the standards provided by the assessment criteria and the completion of assignments in accordance with awarding organisation guidance.  |   |  |
| <b>Learning outcomes<br/>The learner will:</b>                              | <b>Assessment criteria<br/>The learner can:</b>  |   |  |
|   | Pass   | Merit   | Distinction  |
| 1. Understand current and future emerging technologies in the digital world | 1.1 Explain the benefits of using digital tools<br>1.2 Describe the evolution of: <ul style="list-style-type: none"> <li>- social media</li> <li>- collaboration</li> <li>- project management</li> <li>- leadership and technology</li> <li>- digital technology</li> </ul>   | 1M1<br>Explain the benefits technology has had on a range of industries     | 1D1<br>Analyse the importance of planning for future emerging technology for a business                      |
| 2. Understand the use of artificial intelligence in society                 | 2.1 Explain the term artificial intelligence<br>2.2 Explain how artificial intelligence is used<br>2.3 Describe how artificial intelligence has benefited society<br>2.4 Explain the concerns people have in relation to artificial intelligence<br>2.5 Explain how artificial intelligence could be used in the future                                  | 2M1<br>Explain how to overcome concerns relating to artificial intelligence | 2D1<br>Evaluate the impact artificial intelligence has in personal and business activity, in today's society |

|  |   |   |   |
|--|---|---|---|
| <p>3. Understand the implications of change in technology</p>                  | <p>3.1 Explain the need for change<br/>3.2 Carry out a change impact analysis<br/>3.3 Explain how change can affect people<br/>3.4 Explain methods of implementing change<br/>3.5 Explain the considerations to make when adapting emerging technologies</p>                              |   |   |
| <p>4. Be able to research and present information on emerging technologies</p> | <p>4.1 Research new emerging technologies suitable for a range of industries<br/>4.2 Plan and draft research to include written communication<br/>4.3 Present findings of research in written format<br/>4.4 Explain research approaches available to investigate emerging technology</p> | <p>4M1<br/>Use own self review to improve own work by implementing any findings</p> | <p>4D1<br/>Present academic work in a verbal presentation and discuss the content of own work</p> |
| <p>5. Understand the future of computing</p>                                   | <p>5.1 Identify future technology developments<br/>5.2 Explain methods of researching new developments to keep up to date with computing developments<br/>5.3 Explain how to future proof computing systems</p>   |   |   |

## Indicative Content

### 1 Understand current and future emerging technologies in the digital world

- Reasons why digital tools are used include, but not limited to:
  - Increase efficiencies
  - Provide automation
  - Assist with management
  - Provide real time reporting
- Social media evolution: personal channels, business channels, mobile access etc.
- Collaborating evolution: face to face, video calling, screen sharing, coloration software and its features

- Project management evolution: desktop based to cloud based, task tracking, reminders, allocating accountability, responsibility tracking etc.
- Leadership and technology evolution: remote working, blended learning, virtual learning etc.
- Digital technology evolution: Cloud systems, smartphones, tablets, smart watches

## **2 Understand Artificial Intelligence and it's uses in society**

- Learners should understand what Artificial intelligence is, this should be supported with real life working examples to aid understanding.
- Artificial intelligence has benefited society by:
  - Saving time and money by automating processes and tasks
  - Increasing productivity and efficiencies
  - Allowing faster business decisions based on outputs from technologies
  - Reduce mistakes and 'human error'
- Concerns:
  - Privacy
  - Bias
  - Inequality
  - Safety
  - Security
- Future emerging technology:
  - big data
  - Robotics
  - Internet of Things (IoT)

## **3 Understand the process of managing change**

- Need for change:
  - To ensure a modern workplace
  - To keep up to date with new technology
  - To keep up to date with competitors
  - To allow businesses to adapt
- Change impact analysis:
  - Who is the change going to affect?
  - How will the change affect them?
  - What measures can be taken to mitigate the impact of the change?
- Methods of implementing change:
  - Consultation with affected people
  - Clearly define the change and align to business goals
  - Determine the impacts the change will have and who it will affect
  - Develop a communication strategy
  - Provide training if required
  - Implement support measures
  - Measure the change process and the effect
- Researching emerging technology: Methods could include online research, articles, subscription to online services, newsletters, watching dedicated news broadcasts, following social media channels etc.

- Considerations to make when adapting emerging technologies, could include but not limited to:
  - Resistance to change from people
  - Compatibility of technology with existing systems
  - Reliability of the new technology
  - Security of the new technology
  - Support measures available if the technology fails

#### **4 Research and present information on emerging technologies**

- Emerging technology: Examples of emerging technologies include:
  - Sensing and mobility
  - Augmented human reality
  - Digital ecosystems
  - Advanced artificial intelligence (AI) and analytics
  - Self-Driving Cars
  - Internet of Things (IoT)
  - Block chain
  - Biometrics
  - 5G
  - Virtual Reality and Augmented Reality
  - 3D Printer
- Learners should ensure that the presentation is presented formally using presentation software. This will allow learners to showcase their communication skills.
- The presentation should provide suggestions for a range of industries such as health, financial, manufacturing etc.
- All research should be supported with appropriate references
- All written communication should be checked for Grammar and spelling

#### **5 Understand the future of computing**

- Future developments should include the use of artificial intelligence i.e. smart home speakers, voice controlled cars, smart locks, smart lights and how these elements could be development over the future years to create a 'smart home' and 'smart business'
- Learners should understand the method of researching new technology updates, i.e. technology websites, online blogs, digital newsletters, social media and publications
- Future proofing should be considered from the beginning of the project, i.e. the equipment and software should be scalable and non-restrictive allowing the system to continue to grow and expand over the future

| <b>Introduction to Mobile Application Development</b>   |  |  |  |
|---|--|--|--|
| <b>Unit aims</b>  | This unit aims to provide an overview on the basics of mobile application development. Learners will gain knowledge and understanding on how to plan, develop, test and launch a mobile application to solve a solution to a problem.  |  |  |
| <b>Unit level</b>                                       | 3  |  |  |
| <b>Unit code</b>  | Y/618/4178   |  |  |
| <b>GLH</b>  | 60   |  |  |
| <b>Credit value</b>                                     | 10   |  |  |
| <b>Unit grading structure</b>                           | Pass, Merit and Distinction  |  |  |
| <b>Assessment guidance</b>                              | In order to achieve this unit, learners must produce work which demonstrates achievement of the learning outcomes at the standards provided by the assessment criteria and the completion of assignments in accordance with awarding organisation guidance.  |  |  |
| <b>Learning outcomes</b><br><b>The learner will:</b>    | <b>Assessment criteria</b><br><b>The learner can:</b>  |  |  |
|   | Pass   | Merit  | Distinction  |
| 1. Understand the purpose of a mobile application       | 1.1 Explain the features within a mobile application<br>1.2 Explain the reasons for developing personal and business mobile applications<br>1.3 Identify a problem which a mobile application could solve<br>1.4 Describe platforms and devices mobile applications run on<br>1.5 Explain the difference between Native, Web and Hybrid applications | 1M1<br>Explain how mobile applications enhance the customer experience | 1D1<br>Analyse the impact of developing a business application for only one platform |
| 2. Be able to plan for a mobile application development | 2.1 Outline user requirements for a solution<br>2.2 Outline the technical requirements of the application<br>2.3 Create a user interface design for the mobile application (UX or UI)<br>2.4 Create a wireframe for the application screens<br>2.5 Build a prototype of the mobile application   |  |  |

|   |  |   |  |
|---|--|---|--|
| <p>3 Be able to develop a mobile application</p>                          | <p>3.1 Explain the purpose of using a Software Development Kit (SDK)<br/>3.2 install and setup a project using a Software Development Kit (SDK)<br/>3.3 Demonstrate use of the tools and techniques of a Software Development Kit (SDK)<br/>3.4 Demonstrate use of a Software Development Kit (SDK) to develop the client side of a mobile application<br/>3.5 Demonstrate use of a Software Development Kit (SDK) to develop the back end of a mobile application</p> | <p>3M1<br/>Include additional functionality in a mobile application</p> | <p>3D1<br/>Connect a mobile application to a database</p>                |
| <p>4 Be able to test a mobile application</p>                             | <p>4.1 Describe the testing methods used for mobile applications<br/>4.2 Create a test plan based on user requirements<br/>4.3 Test each user requirement and document the outcome<br/>4.4 Evaluate and review the application as a result of testing</p>  | <p>4M1<br/>Explain the benefits of using a focus group for testing</p>  | <p>4D1<br/>Analyse the impact incomplete testing would have on users</p> |
| <p>5 Understand how to launch a mobile application to the marketplace</p> | <p>5.1 Explain the range of application marketplaces<br/>5.2 Explain the costs for launching an application to the marketplace<br/>5.3 Describe marketplace application requirements<br/>5.4 Explain how to launch an application to the marketplace</p>   |   |  |

**Indicative Content**

**1 Understand the purpose of a mobile application**

- Reasons could include personal lifestyle benefits, i.e. fitness applications, store memberships, e-banking etc. Business needs could include method to communicate with customers, accessibility, greater offering to customers
- Common features could include easy to follow navigation, icon, notifications, link to device features such as camera, contacts, ability to backup data
- Platforms should include Android and Apple. Device should include mobile phones and tablets
- Learners should understand the differences between native, web and hybrid application approaches and when/why a specific option would be used. Learners should be shown examples of these approaches to application development to aid understanding. Learners should also be aware of the limitations between these approaches.

## **2 Plan for a mobile application development**

- User requirements should be precise and clear in have a unique reference against each requirement i.e. UR1
- Technical requirements should include the back end of the application, any links to databases, how the application is going to work
- User interface should show each screen of the applications visually as it would look once developed, this should include icons, text areas, colours, logos, navigation etc.
- Wireframe should be a basic structure of how the application is to be configured i.e. how to move between screens, where each button will take you etc.
- The prototype should allow navigation of the application based on the user interface but would not have any link to databases etc.

## **3 Be able to develop a mobile application**

- SDKs included Android SDK/Android Studio and iOS SDK
- Learners should be able to install the chosen SDK and setup a project for an application
  - Tools and techniques include:
    - live development
    - simulator to test on a device
    - debugging
    - use of libraries and sample code
    - documentation
    - activities and methods
- Learners must be able to design a basic mobile application using an SDK environment

## **4 Be able to test a mobile application**

- Testing should include:
  - Compatibility testing - running the application on different devices
  - Interface testing - testing the navigation and menu performance
  - Low-level resources testing - testing the application running on low battery, slow Internet connection, mobile internet connection, Wi-Fi etc.
  - Security testing – ensuring data is secure when processed on the application
  - Beta testing – testing the application with a user focus-group and getting feedback.
- The test plan should make reference to the specific user requirement number i.e. UR1
- The outcome of each specific test should be documented satisfy the requirement has been met
- The application should be amended if the results of the testing indicate this is required

## **5 Understand how to launch a mobile application to the marketplace**

- Application marketplaces includes Apple App Store and Google Play store
- Costs should include subscriptions to be a developer on the marketplace, costs for any third-party database/storage used for the application, costs for any security certificates etc.
- Learners should understand that each marketplace will have a specific set of regulations/requirements to fulfil in order for them to approve an application, this could be in relation to the coding language used, the version of the software, the use of any third parties, the resolution, the content of the application etc.
- Learners should be aware of how to launch an application on a marketplace, i.e. register for the marketplace, subscribe/pay any associated costs, deciding on the description and category for the application and the packaging of the application file from the SDK and uploading to the marketplace



| <b>Introduction to Web Development</b>               |   |   |  |
|--|---|---|--|
| <b>Unit aims</b>                                     | This unit aims to provide an overview of web development. Learners will gain knowledge and understanding on how to plan, develop, test and launch a website. Learners will develop an understanding of engaging users and the inclusion of databases within websites.   |   |  |
| <b>Unit level</b>                                    | 3   |   |  |
| <b>Unit code</b>                                     | D/618/4179  |   |  |
| <b>GLH</b>   | 60  |   |  |
| <b>Credit value</b>                                  | 10  |   |  |
| <b>Unit grading structure</b>                        | Pass, Merit and Distinction   |   |  |
| <b>Assessment guidance</b>                           | In order to achieve this unit, learners must produce work which demonstrates achievement of the learning outcomes at the standards provided by the assessment criteria and the completion of assignments in accordance with awarding organisation guidance.   |   |  |
| <b>Learning outcomes</b><br><b>The learner will:</b> | <b>Assessment criteria</b><br><b>The learner can:</b>   |   |  |
|  | Pass  | Merit   | Distinction  |
| 1. Understand website development planning           | 1.1 Explain the methods that can be used to create a website<br>1.2 Outline the importance of having a responsive website<br>1.3 Explain website design issues to consider<br>1.4 Explain the tools used for website development<br>1.5 Define the languages used for website development<br>1.6 Create a storyboard for a website design | 1M1<br>Explain the benefits of using a storyboard design for developing a website               | 1D1<br>Analyse the impact of designing a website without sufficient pre-planning       |
| 2. Be able to produce interactive webpages           | 2.1 Explain the laws, regulations and standards relating to website development<br>2.2 Describe how databases are used within websites<br>2.3 Setup and configure a database to link to a website   | 2M1<br>Evaluate the impact that laws, regulations and standards have on the design of a website | 2D1<br>Include features that provide additional functionality in a webpage development |

|                                       |   |  |  |
|---------------------------------------|---|--|--|
|                                       | <p>2.4 Configure and run database queries and lookups</p> <p>2.5 Develop a website with a range of web pages</p> <p>2.6 Insert media content into web pages</p> <p>2.7 Create a style sheet for the website</p>   |  |  |
| 3. Be able to test webpages           | <p>3.1 Explain the reasons for testing a website</p> <p>3.2 Describe the methods of testing a website</p> <p>3.3 Create a website test plan</p> <p>3.4 Carry out user testing on a website and amend as a result of testing</p>                                       |  |  |
| 4. Be able to publish websites online | <p>4.1 Describe the process of publishing a website online</p> <p>4.2 Explain the purpose of a domain name</p> <p>4.3 Describe website hosting considerations to make</p> <p>4.4 Setup and configure a web hosting solution</p> <p>4.5 Upload a website using FTP</p> |  |  |

## Indicative Content

### 1. Understand website development planning

- Methods of creating a web site should include templates, code, site builders etc.
- Tools include photo manipulation, text editors, code editors, code studios etc.
- Design issues include:
  - Effectiveness, fit for purpose, content, website colours, image formats, font families, speakers and audio
  - Layout, HTML, tables, layers, CSS
  - readability, content, accessibility, colours, navigation, target audience, fonts, imagery
  - formats, layout, backgrounds, size, scrolling, platforms

- browsers; loading speed, broken links, client side constraints
- hardware, software, monitor resolution, size, memory, internet connection; plug-ins e.g. video/audio player
- Languages should include HTML, CSS, Java etc.
- Storyboard should include a wireframe approach to the basic structure of the website

## 2. Be able to produce interactive webpages

- Laws, regulations and standards include World Wide Web Consortium (W3C), Web Content Accessibility Guidelines (WCAG), Copyright, Design and Patents Act 1988, GDPR (cookie consent), Companies Act, Privacy Policy
- Database are used to store structured collections of data. For example, this could be customer information, orders etc.
- Learner should be able to setup and use a database entering sets of sample data and running queries/lookups on the data entered. Examples of databases include MySQL, Oracle etc.
- Webpages should be interactive. This could include:
  - tables, text, font, colour, layers, frames, body, links, headings tags (H1, H2, H3)
  - images e.g. JPEG, GIF, PNG
  - advanced content e.g. DHTML, JavaScript,
  - Image maps, Slices, SWF, audio, video
  - navigation elements, text areas, consistent colour themes
- Media could include audio, video, images etc. Learners should be familiar with the use of stock images and the copyright associated with using online images
- Learners should be able to create a CSS stylesheet and understand the benefits for using a style for a website design
- This can be evidenced through the use of a coding evidence, screenshots or raw database files.

## 3 Be able to test webpages

- Reasons include: ensuring end user satisfaction, to identify any broken links, identify any compatibility issues, identify any usability/navigation issues
- Testing methods include:
  - Functionality Testing
  - Usability Testing
  - User Interface Testing
  - Compatibility Testing
  - Performance Testing
  - Security Testing
- Test plan should include the element you are testing, the scope of the test, the expected outcome, the device used to test and the overall outcome
- Learners should be able to complete user testing on the website developed

## 4 Be able to publish websites online

- Process should include checking domain names, purchasing hosting, uploading website using FTP software, verifying success upload using web browser
- Domain name represent an internet protocol (IP) resource and saves the user from entering the direct IP address
- Considerations should include the bandwidth, location of the hosting servers, capacity of storage with the package, speed of the service, uptime levels, cost, hosting company reputation, SSL certificates, email inboxes included etc.

- Learners should be able to upload a website from a local copy using an FTP login and FTP software and making the website accessible online. This can be evidenced through the use of a live link or screenshots.