

ATHE Level 4 Diploma in Computing

601/4740/4



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About ATHE

Awards for Training and Higher Education (ATHE) is a global awarding organisation, regulated by Ofqual and other UK and International regulators. We provide centres with a wide variety of qualifications including but not limited to management, health & social care management, travel & tourism management and computing.

For a full list please visit our website: www.athe.co.uk

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

We are known for our excellent customer service, efficient support and flexible qualifications that offer diverse progression routes.

Our Qualifications

Our qualifications are the culmination of expert input from colleges, higher education, industry professionals and our qualification development team. We have taken advantage of the flexibility of the RQF to develop a suite of awards, certificates and diplomas that offer progression across many of the RQF levels.

Support for Centres

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

- delivery, assessment and quality assurance guidance, suggested resources and sample assignments
- an ATHE centre support officer who guides you through the centre recognition process, learner registration and learner results submission
- health check visits to highlight any areas for development
- an allocated ATHE associate for advice on delivery, assessment and verification

ATHE Level 4 Diploma in Computing

This document provides key information on ATHE's Level 4 Diploma in Computing, 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 on resources and assessment is provided separately.

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 document. Each unit within a qualification also has a Unit Reference Number.

The QN number for this qualification is as follows:

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Regulation Dates

This qualification is regulated from 1st November 2014 which is the operational start date in centres.

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.

Entry Requirements

This qualification is designed for learners who are typically aged 18 and above.

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

- they should be available to everyone who is capable of reaching the required standards
- 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 4. 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.

For learners who have recently been in education or training the entry profile is likely to include one of following:

- a GCE Advanced level profile with achievement in 2 or more subjects supported by 5 or more GCSEs at grades C and above
- other related level 3 subjects
- an Access to Higher Education Certificate delivered by an approved further education institute and validated by an Access Validating Agency
- other equivalent international qualifications

Learners may also have relevant work experience.

Mature learners may present a more varied profile of achievement that is likely to include relevant work experience (paid and/or unpaid) with levels of responsibility, participation and/or achievement of relevant professional qualifications. This may be used for recognition of prior learning (RPL).

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 this qualification have the necessary background knowledge, understanding and skills to undertake the learning and assessment at level 4. 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 Verifiers will take account of this information at the external verification 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

Introduction to ATHE Level 4 Diploma in Computing

Our new qualification in Computing at Level 4 has been developed to conform to the requirements of the RQF, to meet the requirements of the sector and to respond to the needs of our centres.

This qualification provides the core knowledge, understanding and skills to support learners planning to further their studies in computing. It is equivalent to the first year of a degree programme in Computing. Learner may also progress from this qualification to employment in the sector.

Support and Recognition

This qualification has been developed with the support of higher education providers and centres who are planning to deliver computing qualifications at this level.

Progression

On successful completion of a Level 4 qualification in Computing there are a number of progression opportunities.

Learners may progress to:

- a level 5 ATHE qualification such as the ATHE Level 5 Diploma in Computing
- employment in a computing and/or technology role at an appropriate level
- the second year of a degree programme

Recognition of Prior Learning (RPL)

The RQF is based on the principle of credit accumulation and transfer. Learners have the opportunity to build their achievements from a single unit into a full Diploma.

There will be occasions where learners wish to claim recognition of prior learning which has not been formally assessed and accredited. Centres should contact ATHE to 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 of this sector.

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 verifiers on their visits to centres.

ATHE definition of Total Qualification Time (TQT), Guided Learning Hours (GLH) and Credit

Values for Total Qualification Time, Guided Learning Hours and Credit, are calculated by considering the different activities that a Learner would **typically** complete to demonstrate achievement of the learning outcomes of a qualification.

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.

Guided Learning Hours (GLH)

The term Guided Learning Hours (GLH) is 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.

GLH are intended to provide guidance for centres on the amount of time required to deliver the programme and support learners. GLH are made up of activities completed by the learner under direct instruction or supervision of a tutor/teacher, lecturer, supervisor, trainer etc. whether through actual attendance or via electronic means, the activity must be in real time.

Some examples of activities that can contribute to Guided Learning Hours include:

- Supervised induction sessions
- Learner feedback with a teacher in real time
- Supervised independent learning
- Classroom-based learning supervised by a teacher
- Work-based learning supervised by a teacher
- Live webinar or telephone tutorial with a teacher in real time
- E-learning supervised by a teacher in real time
- All forms of assessment that take place under the immediate guidance or supervision of a lecturer, supervisor, tutor or other appropriate provider of education or training, including where the assessment is competence-based and may be turned into a learning opportunity.

Total Qualification Time (TQT)

Total Qualification Time (TQT) is a guide to the amount of time a learner would take, **on average**, to complete the different activities to demonstrate achievement of the learning outcomes of a whole qualification.

TQT includes all the activities described under guided learning hours (GLH) plus all the **additional learning**.

Additional learning will take place away from the classroom and this will **not** be under direct supervision of a tutor/teacher, lecturer, supervisor, trainer etc. The activities will vary depending on the qualifications, their level and the nature of the learning.

Some examples of activities that can contribute to Total Qualification Time, include:

- Preparation for classes
- Independent and unsupervised research/learning
- Unsupervised work on assignments
- Unsupervised compilation of a portfolio of work experience
- Unsupervised e-learning
- Unsupervised e- assessment

- Unsupervised e-assessment
- Unsupervised coursework
- Watching a pre-recorded podcast or webinar
- Unsupervised work-based learning
- Any other form of learning, education or training, not under the direct supervision of a tutor/teacher, lecturer, supervisor, trainer.

Credit

The credit value specifies the number of credits that will be awarded to a learner who has achieved the learning outcomes of a unit at the specified standard.

Each credit represents 10 hours of learning time and equates to 10 hours of total qualification time. Therefore, one 15 credit unit represents 150 hours of total qualification time. Learning time is a **notional measure** which indicates the amount of time a learner at the level of the unit is expected to take, **on average**, to complete the learning outcomes of the unit to the standard determined by the assessment criteria.

Learning time includes all the activities described under guided learning hours and additional learning. The credit value of the unit will remain constant in all contexts regardless of the assessment method or the mode of delivery. Learners will only be awarded credits for the successful completion of whole units.

Qualification Structure

ATHE Level 4 Diploma in Computing

The ATHE Level 4 Diploma in Computing is a 120 credit qualification.

Rules of combination

Learners must achieve 120 credits by completing all ten mandatory units.

Total Qualification Time is 1200 Hours

Total Guided Learning Hours is 480

Total Credit Value is 120

Unit Codes	Unit Title	Level	Credit	GLH
K506/7680	IT and Society	4	12	48
M/506/7681	Computer Systems and Software	4	12	48
T/506/7682	Computer Programming	4	12	48
A/506/7683	Relational Database Systems	4	12	48
J/506/7718	Software Engineering	4	12	48
L/506/7719	Systems Analysis and Design	4	12	48
J/506/7721	E-commerce Applications	4	12	48
F/506/7720	Human Computer Interaction	4	12	48
L/506/7722	Information Systems Theory and Practice	4	12	48
R/506/7723	Management Information Systems	4	12	48

Guidance on Assessment and Grading

Assessment

For all ATHE qualifications assessment is completed through the submission of internally assessed learner work. To achieve a pass for a unit, a learner must have successfully achieved the learning outcomes at the standards set by the assessment criteria for that unit. There is no external assessment (i.e. examinations) attached to any unit; nor is there any dissertation requirement.

ATHE will provide a sample assignment for each unit which can be used as the assessment for the unit. 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 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, can be used provided the content of the assignment is clearly mapped to show which assessment criteria from which units are being covered.

Methods of Assessment

ATHE encourages the use of a range of assessment methods 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.

We would recommend the use of a variety of types of assessment. 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 project in response to a design brief (for example a computer programme/a data base)
- The production of a portfolio of evidence relating to a particular unit
- The creation of a prototype for a specified product

This list is by no means exhaustive but gives examples of some 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. These records must be retained as they will be checked at external verification 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 Verifier 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:

- Devised assignments are clearly mapped to the unit learning outcomes and assessment criteria they have been designed to meet.
- That the command verbs used in the assignment are appropriate for the level of the qualification, e.g. analyse, evaluate. That 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).

- Students are well-briefed on the requirements of the unit and what they have to 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.
- That work submitted can be authenticated as the learner's own work and that there is clear guidance on the centre's Malpractice Policy.
- That there is an assessment plan in place identifying dates for summative assessment of each unit and indicating when external verification will be needed.
- Sufficient 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 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.

This qualification involves assessment using judgements against 'Pass' Assessment Criteria to make a decision about whether a learner has met the required standard. Our grading system is simple 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 either Pass 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 does not meet all Learning Outcomes at Pass standards stated in the assessment criteria in a unit > Learner gains a Fail for the unit
- Learner achieves a Pass for all the required units in the rules of combination > learner achieves a Pass for the qualification
- Learner does not achieve a Pass for all the required units in the rules of combination > learner achieves a Fail for the qualification but may receive unit credit certification for those units achieving a Pass

Qualification Grading Structure

Determining the Overall Qualification Grade

Each unit is graded pass or fail. As well as receiving a grade for each individual unit learners will receive an overall grade for the qualification. Each unit is equally weighted.

To achieve a Pass grade for the qualification the learner must achieve a Pass for all the required units in the rules of combination.

Quality Assurance of Centres

Centres delivering ATHE RQF qualifications must be committed to ensuring the quality of the units

and qualifications they deliver, through 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 who are not already recognised to deliver ATHE qualifications
- Approval to offer ATHE RQF qualifications and units in Computing at Level 4

Once a centre registers learners for a qualification, they will be allocated an External Verifier who will visit at an early stage in the programme to ensure that an appropriate assessment plan is in place.

Centres will be required to undertake training 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 verification can be authenticated as the learner's own.

Centres should refer to the ATHE Malpractice 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 learning about. Learners should be encouraged to take responsibility for their learning and should 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 sufficient 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.

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've done meets the assessment criteria.
- Contextualise your activities, e.g. using real case studies as a theme through the sessions.
- 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.

Resources

ATHE has provided a list of suggested reading resources and the minimum software/hardware required to deliver the qualification. Please refer to the qualification guidance webpage to access these resources.

Unit Specifications

Unit Format

Each unit in ATHE's suite of level 4 qualifications is presented in a standard format. This format provides guidance on the requirements of the unit for learners, tutors, assessors and external verifiers.

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 a 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 is 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.

Total Qualification Time (TQT)

TQT represents the total time required for a learner to complete a qualification.

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 4 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.

IT and Society	
Unit Aims	Learners will understand ethical, legal and regulatory issues relating to IT. They will also understand the impact of IT on society.
Unit Level	4
Guided Learning Hours	48
Credit Value	12
Unit Grading Structure	Pass
Assessment Guidance	To achieve this unit, learners must achieve the learning outcomes and meet the standards specified by the assessment criteria for the unit. Additional assessment guidance is provided on the ATHE sample assignment brief.
Learning Outcomes – The learner will:	Assessment Criteria – The learner can:
1. Understand how IT has changed the way people live and work	1.1 Analyse significant developments in IT in the last 50 years 1.2 Evaluate how IT has changed society over the last 50 years 1.3 Explain how IT has changed the way people work in the last 50 years
Indicative Content	
<ul style="list-style-type: none"> Computers and society: Explaining digital citizenship, Community and the information age, Gender, Age, Culture. Impact of IT in society: Understanding the environment, Explaining the impact of the information age to social groups. IT induced changes for individuals: Everyday life, At home, At school, At the workplace. 	
2. Understand IT issues in society	2.1 Explain the significance of digital citizenship to society 2.2 Explain the impact on individuals of living in the information age 2.3 Evaluate current issues in society relating to personal data
Indicative Content	
<ul style="list-style-type: none"> Social issues: Government role in information handling, Cultural diversity as a success factor for IT, regional and national perceptions of IT. Professional issues: Code of ethics, IT professional culture. Shaping the future developments: Internet penetration in everyday life, Smart devices, Social networks, Managing data and information. 	
3. Understand current legal, ethical and regulatory issues in IT	3.1 Evaluate current legal, ethical and regulatory issues in IT 3.2 Assess the importance of ethical guidelines in IT 3.3 Evaluate the impact of a current legal, ethical or regulatory issue in IT on a chosen organisation
Indicative Content	
<ul style="list-style-type: none"> Legal issues: IT related liabilities, Legislation relating to IT, Impact of legislation on systems development. Ethical issues: Dealing with personal data, Ethical systems design and development. Risks: Computer threats, Digital crime, Privacy, Security, Impact of e-everything (e.g. e-marketing, e-banking). 	

Computer Systems and Software	
Unit Aims	This unit will develop learners' understanding of the integration of hardware and software components. Learners will explore how hardware serves specific computer processing functions and investigate the use of various software applications.
Unit Level	4
Guided Learning Hours	48
Credit Value	12
Unit Grading Structure	Pass
Assessment Guidance	To achieve this unit, learners must achieve the learning outcomes and meet the standards specified by the assessment criteria for this unit. Additional guidance is provided on the ATHE sample assignment brief. Learners will design a computer system in line with the client brief and they will need to demonstrate advanced database skills during the implementation stage.
Learning Outcomes – The learner will:	Assessment Criteria – The learner can:
1. Understand components of computer systems	1.1 Describe components of different computer systems 1.2 Analyse networking infrastructures 1.3 Assess the function of components within a chosen computer system 1.4 Evaluate peripheral devices to meet different purposes
Indicative Content	
<ul style="list-style-type: none"> • Computer components: defining a computer system, system component types • Networking infrastructures: system connectivity, network types, hardware infrastructure, networking software • Component functionality: processing, memory, system interfaces (input/output) • Peripheral devices: limitations of computer systems, designing expandable systems, device types. 	
2. Understand computer software	2.1 Evaluate different operating systems explaining their role in managing resources 2.2 Critically assess the use of different software applications to meet specific purposes 2.3 Assess the use of web applications to enhance user experience 2.4 Assess the use of mobile applications to enhance user experience
Indicative Content	
<ul style="list-style-type: none"> • Operating systems: the role of an operating system, OS types • Software applications: the role of software applications, functionality and services supported by software, application types • Web applications: the impact of the World Wide Web, architecture of web applications, web application types, web services • Mobile applications: the role of mobile applications, interface issues, mobility issues, connectivity issues, security issues 	

Computer Programming	
Unit Aims	Learners will use different tools and techniques to design, implement and test programs, following the system life cycle. They will use an appropriate programming language and learn about the principles of good programming to enable them to create computer programs.
Unit Level	4
Guided Learning Hours	48
Credit Value	12
Unit Grading Structure	Pass
Assessment Guidance	To achieve this unit, learners must achieve the learning outcomes and meet the standards specified by the assessment criteria for the unit. Additional assessment guidance is provided on the ATHE sample assignment brief.
Learning Outcomes – The learner will:	Assessment Criteria – The learner can:
1. Understand principles of computer programming	1.1 Critically evaluate application programming interfaces (API) 1.2 Critically appraise the stages of the software development lifecycle 1.3 Explain the language constructs to be used within a programme
Indicative Content	
<ul style="list-style-type: none"> • Application Programming Interface (API) evaluation: the need for API, API technologies, API evaluation criteria (security, functionality, usability) • Software Development Life Cycle: SDLC importance, SDLC and programming • Programming paradigms: Procedural programming, Functional programming, Object-oriented programming • Programming language constructs: Variables, Constants, Operators, Loops, Conditional Statements 	
2. Be able to develop a computer program to a client brief	2.1 Design a computer program to meet a client brief using programming principles 2.2 Develop a computer program to an agreed client brief
Indicative Content	
<ul style="list-style-type: none"> • Designing a computer programme: Using data models, The role of conceptual modelling, Algorithms, Pseudocode • Developing a computer programme: Structuring a simple program 	
3. Be able to evaluate a computer program	3.1 Test a computer program that has been developed 3.2 Analyse test results against expected results to identify discrepancies 3.3 Make recommendations for improvements to a computer program before final release to a client

Indicative Content

- Testing a program: Testing programming practices, Testing data structures, Testing algorithm
- Analysing test results: Test reports, Verification, Validation
- Evaluating feedback: User evaluation, the role of software documentation, Dealing with integration, installation, deployment, updates
- Improving a program: Change requests, Scalability, Maintenance, Support

Relational Database Systems	
Unit Aims	This unit will develop learners' understanding of database systems and data analysis and modelling. They will understand how normalisation and functional dependency theory is used to design a relational database and how the client-server model is used.
Unit Level	4
Guided Learning Hours	48
Credit Value	12
Unit Grading Structure	Pass
Assessment Guidance	To achieve this unit, learners must achieve the learning outcomes and meet the standards specified by the assessment criteria for the unit. Additional assessment guidance is provided on the ATHE sample assignment brief
Learning Outcomes – The learner will:	Assessment Criteria – The learner can:
1. Understand database management systems	1.1 Explain the database Management System (DBMS) 1.2 Explain the different levels of database architecture 1.3 Describe big data and how it applies to database management systems 1.4 Explain transaction processing within database management systems 1.5 Evaluate the importance of data integrity and quality control within a database management system
Indicative Content	
<ul style="list-style-type: none"> • DBMS: DBMS overview, DBMS types, • Database architectures: data models, data schemas, DBMS levels • Big data: big data explained, big data management, applications of big data • Transaction processing: concepts, transaction processing systems, OLTP, OLAP • Data integrity: data quality management, quality control in DBMS, data integrity explained, data security 	
2. Understand database design	2.1 Explain relationships within a database 2.2 Explain the integrity constraints within relational models 2.3 Explain normalisation and functional dependency within a database 2.4 Explain database administration including integrity and security control
Indicative Content	
<ul style="list-style-type: none"> • Database relationships: relationships, joins, keys • Integrity constraints: referential integrity, domain integrity, entity integrity, foreign key integrity • Functional dependencies: schema normalisation, normal forms • Database administration: the role of the DBA, DBA skills and responsibilities 	

3. Be able to design a database system	3.1 Design a relational database to meet a specified design brief 3.2 Explain how the design documents meet design brief 3.3 Evaluate database design following feedback
Indicative Content	
<ul style="list-style-type: none"> • Relational database design: design fundamentals, logical vs. physical design • Database documentation: stakeholders for database documentation, documentation types • Database evaluation: performance evaluation benchmarks, verification, validation 	

Software Engineering	
Unit Aims	Learners will gain an understanding of the need for Software Engineering and the different methods and techniques.
Unit Level	4
Guided Learning Hours	48
Credit Value	12
Unit Grading Structure	Pass
Assessment Guidance	To achieve this unit, learners must achieve the learning outcomes and meet the standards specified by the assessment criteria for the unit. Additional assessment guidance is provided on the ATHE sample assignment brief.
Learning Outcomes – The learner will:	Assessment Criteria – The learner can:
1. Understand the software engineering approach to the design and development of software	1.1 Explain software engineering principles 1.2 Explain software engineering methods and techniques 1.3 Explain the modelling tools used for software development and engineering
Indicative Content	
<ul style="list-style-type: none"> • Software engineering principles, Software development process, Software development management • Traditional software development approaches, Software process modelling, Agile software development • Software modelling, system interaction, system structure, system behaviour 	
2. Understand key aspects of software engineering	2.1 Explain software engineering practices 2.2 Evaluate the multidisciplinary nature of software development 2.3 Explain the structure of software engineering teams
Indicative Content	
<ul style="list-style-type: none"> • Analysis tasks, Design tasks, Implementation tasks • Software development and business information, Organisational aspects of system development • Programming teams, Software engineering roles, Software engineering tasks 	
3. Be able to apply a software engineering approach to software and systems development	3.1 Apply a software engineering approach to software development for information management 3.2 Use software engineering methods in systems development 3.3 Explain the role of data verification and validation in systems development
Indicative Content	
<ul style="list-style-type: none"> • Project management for software development, project planning, business process reengineering • Data modelling, Object oriented analysis and design, Behavioural models • Data verification, Data validation 	

Systems Analysis and Design	
Unit Aims	Learners will be able to understand the systems development life cycle and the role of systems methodologies within the life cycle. Learners will be introduced to different fact finding and problem-solving techniques and they will use these to analyse an existing system. They will recommend improvements and plan to implement these improvements for a client.
Unit Level	4
Guided Learning Hours	48
Credit Value	12
Unit Grading Structure	Pass
Assessment Guidance	To achieve this unit, learners must achieve the learning outcomes and meet the standards specified by the assessment criteria for the unit. Additional assessment guidance is provided on the ATHE sample assignment brief.
Learning Outcomes – The learner will:	Assessment Criteria – The learner can:
1. Understand systems analysis and design	1.1 Explain the role of systems analysis and design in systems development 1.2 Critically analyse the systems development lifecycle 1.3 Explain how systems analysis can be influential in the redesign of a system 1.4 Evaluate different design methods and methodologies that can be used to analyse systems
Indicative Content	
<ul style="list-style-type: none"> • Systems development lifecycle – Waterfall, V-shape, Spiral. • Systems development methods: SSADM, DSDM, Agile, Prototyping • Systems analysis – Requirements elicitation, Stakeholder analysis, Systems design process 	
2. Be able to use systems analysis and design techniques to recommend improvements to an existing system	2.1 Select methodology to analyse an existing system justifying choice 2.2 Use different information gathering techniques to review an existing system 2.3 Recommend improvements to an existing system
Indicative Content	
<ul style="list-style-type: none"> • Information gathering techniques: interviews, observation, documentation investigation, surveys, focus groups. • Business requirements: Using client briefs, Feasibility study, Analysis of system components. • Design processes: Process specification, Data Flow Diagrams, Entity Relationship Diagrams, Using UML 	

3. Be able to develop a solution to improve an existing system	3.1 Present a solution to a client to improve an existing system, using an agreed format, justifying the proposed improvements 3.2 Evaluate feedback from client on proposed solution and make amendments where appropriate
Indicative Content	
<ul style="list-style-type: none"> • Present solution – Feasibility plan, Requirements elicitation • Design specification: Process specification, Data Flow Diagram, Entity Relationship Diagram. • Proposed solution: Implementation plan, Deployment plan, Post-implementation planning. 	

E-commerce Applications	
Unit Aims	Learners will learn about different e-commerce models and applications and how they can be used to develop e-commerce in a small business. They will research the stages involved in setting up e-commerce and they will use e-commerce applications to meet a client brief.
Unit Level	4
Guided Learning Hours	48
Credit Value	12
Unit Grading Structure	Pass
Assessment Guidance	To achieve this unit, learners must achieve the learning outcomes and meet the standards specified by the assessment criteria for the unit. Additional assessment guidance is provided on the ATHE sample assignment brief.
Learning Outcomes – The learner will:	Assessment Criteria – The learner can:
1. Understand principles of e-commerce	1.1 Explain e-commerce principles 1.2 Explain the relationship between e-commerce principles and e-commerce models
Indicative Content	
<ul style="list-style-type: none"> • Stages: Understanding e-commerce concepts, Overview of the role of the Internet in commerce, Issues relating to the creation of e-commerce applications. • Differences between ecommerce and e-business: E-business defined. Overview of e-business models, Benefits of e-commerce for businesses, E-commerce versus e- business. 	
2. Understand why small businesses use e-commerce	2.1 Examine the opportunities and benefits e-commerce offers a small business 2.2 Analyse the threats that a small business has to consider when adopting e-commerce 2.3 Explain solutions to threats to a small business when adopting e-commerce 2.4 Evaluate e-commerce strategies that have proven successful in small businesses
Indicative Content	
<ul style="list-style-type: none"> • Opportunities and benefits: Impact of e-commerce on organisations, SMEs and e-commerce, Towards a global marketplace • Threats: Identifying e-commerce threats, Risk assessment in e-commerce, Dealing with Internet threats, Infrastructure practices techniques and tools for dealing with e-commerce threats • Ecommerce strategies – Developing an e-commerce strategy, assessing e-commerce readiness, Measuring effectiveness of e-commerce solutions. 	
3. Understand e-commerce models used in small businesses	3.1 Evaluate e-commerce models that are appropriate for small businesses 3.2 Critically compare e-commerce revenue models that can be used by a small business

Indicative Content	
<ul style="list-style-type: none"> Ecommerce models: Modelling e-commerce transactions, Importance of e-commerce transaction models, Overview of e-commerce transaction models. Ecommerce revenue models: Creating online revenue, Historical evolution of e-commerce transactions, - Current and future e-commerce revenue models. E-marketing techniques: The role of the e- prefix in business sectors, E-marketing strategies, E-marketing models, E-marketing techniques and tools. 	
4. Understand e-commerce applications	4.1 Explain the effect of e-commerce applications on different types of organisations 4.2 Critically evaluate different applications that can be used to develop an e-commerce site
Indicative Content	
<ul style="list-style-type: none"> Ecommerce applications – Implementation strategies for e-commerce applications, identifying e-commerce application requirements, Designing an e-commerce solution. 	
5. Be able create an e-commerce site using e-commerce application	5.1 Create an e-commerce site in line with industry standards 5.2 Review feedback on e-commerce site 5.3 Present solution to client showing appropriate use of an e-commerce application
Indicative Content	
<ul style="list-style-type: none"> Create online presence: Defining an organisation’s e-commerce offerings, identifying target audience for e-commerce solutions, implementing an e-commerce application design against a given client brief. Feedback: Evaluating e-commerce model, evaluating e-commerce application solution, Evaluating e-commerce application use. Present solution – Deployment of e-commerce solutions, Integration with legacy systems, Maintenance and support of e-commerce applications, Catering for multiple platforms and different users. 	

Human Computer Interaction	
Unit Aims	Learners will develop understanding of principles and models of Human Computer Interaction (HCI). They will evaluate existing HCI design and principles and use this to help them plan their own prototype user interface. They will formulate design documentation to plan an interface for a product. Learners will implement the plan to create a prototype. Learners will review and amend the prototype based on user feedback.
Unit Level	4
Guided Learning Hours	48
Credit Value	12
Unit Grading Structure	Pass
Assessment Guidance	To achieve this unit, learners must achieve the learning outcomes and meet the standards specified by the assessment criteria for this unit. Additional guidance is provided on the ATHE sample assignment brief. Learners will design a relational database in line with the client brief and they will need to demonstrate advanced database skills during the implementation stage.
Learning Outcomes – The learner will:	Assessment Criteria – The learner can:
1. Understand principles of human computer interaction (HCI)	1.1 Evaluate principles of HCI 1.2 Critique interface design using the principles of HCI 1.3 Evaluate user interaction when using different IT applications
Indicative Content	
<ul style="list-style-type: none"> • Cognitive and perceptual principles/laws: HCI origins, Perception and attention, Norman's theory of interaction, Hyck-Hyman response-selection law, Fitts' law • User interface design rules: Designing universal user interfaces, Interfaces that support collaboration, Supporting different interaction styles, Complex interfaces, Schneiderman's eight golden rules, Nielsen's heuristics • Interaction: HCI interaction styles, the interaction design process, User analysis, Evaluating interfaces against requirements 	
2. Be able to plan an interface for a specified application	2.1 Plan an interface for a specified application to meet a brief 2.2 Apply user interface design techniques to meet a brief 2.3 Justify planned use of HCI principles and techniques against industry standards
Indicative Content	
<ul style="list-style-type: none"> • Plan: Storyboards, Navigation, Screen content • Apply: Task centred user interface evaluation, Usability evaluation, Methods for evaluating user interfaces • Justify: User interface specification, User interface fundamental principles, The role of user interface prototypes, User interface development process • Conclude: User interface design basics, Best practices and principles in user interface design, Techniques for designing user interfaces 	

3. Be able to create a prototype using HCI principles	3.1 Generate a user interface for a specified product using planning documents 3.2 Critique user experience of a prototype user interface 3.3 Revise user interface in line with feedback
Indicative Content	
<ul style="list-style-type: none"> • Generate: Identifying application requirements for user interface design, selecting success criteria for user interface design, Aligning user interface components to user functionality • Critique: Performing a usability evaluation of user interfaces, testing visual components, Assessing interface structure and layout, Testing alternative navigation designs, Evaluating interface accessibility • Revise: Performing cooperative evaluation of interface designs, obtaining user feedback, Assessing interface design success 	

Information Systems Theory and Practice	
Unit Aims	Learners will understand the benefits of using information systems to plan a project. They will use an information system to plan and implement an information systems project.
Unit Level	4
Guided Learning Hours	48
Credit Value	12
Unit Grading Structure	Pass
Assessment Guidance	To achieve this unit, learners must achieve the learning outcomes and meet the standards specified by the assessment criteria for the unit. Additional assessment guidance is provided on the ATHE sample assignment brief. Learners will find out about different information systems project management tools and techniques and use these to plan, implement and review their own information systems project.
Learning Outcomes – The learner will:	Assessment Criteria – The learner can:
1. Understand information systems used in organisations	1.1 Critically compare information systems used within different organisations 1.2 Evaluate an information system used in an organisation 1.3 Analyse the information systems needs of a chosen functional area within a business
Indicative Content	
<ul style="list-style-type: none"> Comparing information systems: IS scope, IS structure, IS functionality Evaluating information systems: IS success criteria, IS integration, IS deployment, IS use Information systems needs: user needs analysis, task needs analysis 	
2. Be able to plan the development of an information system	2.1 Prepare a detailed project plan for the development of information system 2.2 Assess the feasibility of a proposed information system 2.3 Explain the requirements of the proposed information system
Indicative Content	
<ul style="list-style-type: none"> Project plan: project management techniques, planning IS projects Feasibility planning: feasibility study, feasibility report Requirements elicitation: requirements capture, requirements analysis, requirements specification, requirements report 	
3. Understand how to review the performance of an information system	3.1 Identify the benefits of reviewing the performance of an information system. 3.2 Provide information on the criteria you have devised for reviewing an information system's performance. 3.3 Assesses the different methods which can be used in an information system review.

Indicative Content

- Implementing an IS project: project management stages
- Developing an information system: design, coding, testing, deployment
- Evaluating an information system: user evaluation, feedback mechanisms, testing
- Improving an information system: change requests, scalability, bug fixing, planned maintenance, support

Management Information Systems	
Unit Aims	Learners will investigate different management information systems and evaluate the common features. They will analyse an existing information system in use by an organisation. They will review records, observe performance and understand the legal and organisational requirements that apply to an information system. They will use their findings to recommend improvements to a management information system and they will present their findings to a client.
Unit Level	4
Guided Learning Hours	48
Credit Value	12
Unit Grading Structure	Pass
Assessment Guidance	To achieve this unit, learners must achieve the learning outcomes and meet the standards specified by the assessment criteria for the unit. Additional assessment guidance is provided on the ATHE sample assignment brief. Learners will design a management information system.
Learning Outcomes – The learner will:	Assessment Criteria – The learner can:
1. Understand management information systems in organisations	1.1 Analyse the use of data within an existing management information system 1.2 Evaluate different features of management information systems 1.3 Explain the importance of compliance with legal and organisational requirements when using a management information system 1.4 Evaluate links between information systems and competitive advantage
Indicative Content	
<ul style="list-style-type: none"> • Different types of information – routine, exception, summary, • Features of information system – common features information system, how support information system, common features computer systems, systems and application software, digital systems/applications • Data security including storage – backup, archive, hack, ethical use of information, DPA etc. • IS for competitive advantage: Enterprise Systems, Supply Chain Management, Customer Relationship Management, Knowledge Management Systems 	
2. Be able to evaluate a management information system in an organisation	2.1 Analyse how an organisation uses a management information system to improve performance 2.2 Evaluate the effectiveness of a management information system in an organisation
Indicative Content	
<ul style="list-style-type: none"> • MIS and performance: managing assets and operations (equipment, software, networks, individuals, procedures, resources) • MIS effectiveness: impact of MIS, principles for effective information management 	
3. Be able to plan improvements to a management information system	3.1 Present recommendations to improve a management information system 3.2 Plan further system development to an information system

Indicative Content

- MIS improvements: studying people, studying technology, studying organisations
- MIS extensions: process identification, process selection, assessment of current processes, process plan, process changes