SQA Advanced Diploma in Computing: Technical Support (International)

GM5C 48

Course Tutor Guide

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Acknowledgement

SQA acknowledges the valuable contribution that Scotland's institutions have made to the development of SQA Advanced Diplomas.

Further information

Call SQA's Customer Contact Centre on 00 44 141 500 5030 or 0345 279 1000. Alternatively, complete our Centre Feedback Form.

Equality and inclusion

The qualifications making up this Group Award have been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners will be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence.

Further advice can be found on our website www.sqa.org.uk/assessmentarrangements.

History of changes

It is anticipated that changes will take place during the life of the qualification, and this section will record these changes.

Version number	Description	Date

Contents

1 Introduction

1.1 Purpose of Course Tutor Guide

This Guide is aimed at staff in SQA Approved Centres who are responsible for the SQA Advanced Diploma in Computing: Technical Support. It will assist you in the delivery, assessment and internal verification of the SQA Advanced Diploma by providing information on setting up a course, the course framework, centre support with course delivery, teaching plans and guidance on assessment of the Units within the course. It also provides information about Core Skills, Graded Units, Quality Assurance and Verification.

Please note that throughout this course tutor guide students will be referred to as '*learners'* or, in the context of assessment, as '*candidates'*.

1.2 Introduction to the Award

The title of the Group Award is SQA Advanced Diploma in Computing: Technical Support.

In recent years there have been significant technology developments in the field of ICT which are having a major impact on businesses and business processes. Cloud computing is an example of a technology trend emerging from the congruence of developments such as real-time infrastructure (RTI), virtualisation, browsers and Web 2.0[1].

More than half employers indicate that issues such as security, cloud computing, convergence of communications and IT and the real world web will have a major impact on business in the next three years[2]

The SQA Advanced Diploma in Computing: Technical Support award has been revised to reflect these changes with the introduction of a number of new Units designed to equip the learner with some of the fundamental knowledge and understanding of these technologies.

This qualification is suitable for the following range of learners:

- Learners articulating from the generic Computing award wishing to specialise in technical support related technologies
- School leavers or apprentices who wish to embark on a course which will lead to either higher education or IT industry employment
- Employed or unemployed adults with appropriate NQGAs (NCs) or vocational skills wishing to train for a career in technical support
- Any other suitable candidate wishing to achieve this award with a view to further articulation to an appropriate HE award or to pursue employment in the ICT sector

[1] Gartner Report, The top 10 Technology trends for 2012
[2] Technology Insights 2012 e-Skills UK

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The SQA Advanced Diploma in Computing: Technical Support is expected to lead to employment opportunities at IT Support technician level. The award has been designed to include opportunities to achieve certification with various industry vendors, eg CompTIA (Computing Technology Industry Association), Microsoft, and LPI (Linux Professional Institute). Learners who achieve the SQA Advanced Diploma in Computing: Technical Support should also be able to articulate onto a range of University degree programmes.

2 Setting up the course

Centres will have been approved to offer this course and will have internal processes for liaising with appropriate parties. Liaison with SQA is normally via the centre's SQA co-ordinator.

It is recommended that a Course Team is set-up by the Institution/Department appointed to oversee the delivery of the course. The Course Team should comprise of all tutors teaching on the course and one tutor should be nominated as Course Team Leader.

The Course Team would have the responsibility for overseeing the quality of delivery on the course and to ensure that academic standards are maintained. The Course Team would also be responsible for monitoring learner progress and determining the support required for individuals who are not progressing well.

The Course Team should meet to discuss matters relating to course delivery, assessment and internal verification on a regular basis (usually two/three times a year) to ensure that any action points are achieved and that the course is delivered efficiently and effectively. It is good practice to maintain a record of such meetings to ensure that any action points are noted and accomplished. This will benefit centres and their students by ensuring that all learners achieve their full potential while maintaining the appropriate standards.

It is good practice for centres to maintain a library of master folders for each of the Units within the course — these may be stored electronically as long as all relevant staff have access to them as and when required. Electronic files on a secure part of the centre's network/intranet are particularly appropriate if the award is delivered across different campuses allowing all tutors to access the most up-to-date materials wherever they are located.

The master folders should contain Unit specifications, teaching materials (including details of learning, teaching and assessment plans; and if appropriate, details of any integration across Units of either teaching or assessment), assessment exemplars and re-assessments. This enables new members of staff to access this valuable resource prior to, and during, delivery of the course.

It is good practice for tutors to familiarise themselves with the Units and specific requirements of the assessments prior to the start of the course. Unit specifications set out the statement of standards and evidence required for achieving each Unit, along with guidance on content and assessment. Assessment exemplars provide an instrument of assessment for each Unit and suggested marking scheme. **The assessment exemplars MUST be kept secure at all times.**

All tutors delivering this course have a collective responsibility to ensure that all learners are supported in a manner that meets their individual needs as they progress through the course.

3 The SQA Advanced Diploma Structure

3.1 General SQA Advanced Diploma Qualification Framework

To be awarded an SQA Advanced Diploma, the candidate is required to achieve **30 SQA Credits** with a mixture of SCQF level 6, 7 and level 8 Units. The SQA Advanced Diploma in Computing: Technical Support qualification is a mixture of SCQF level 7 and level 8 Units.

Each Unit is assigned an **SQA Credit** value of either 1 or 2. This credit value is based approximately on 80 hours of study per credit which consists of 40 hours of structured learning and a further 40 hours of candidate led study to consolidate and reinforce learning.

Each Unit is also assigned a **Scottish Credit and Qualifications Framework** (**SCQF) level and credit point value.** (See below for further details regarding the SCQF).

Each Unit is assigned an agreed number of SCQF credit points. One point represents a notional 10 hours of study by the learner at the identified level.

3.1.1 The Scottish Credit and Qualifications Framework (SCQF)

The SCQF has 12 levels ranging from Access at SCQF level 1, up to Doctorate at level 12. The different levels indicate the level of difficulty of a particular qualification and the difference between levels is dependent on factors such as:

- the complexity and depth of knowledge and understanding
- links to associated academic, vocational or professional practice
- the degree of integration, independence and creativity required
- the range and sophistication of application/practice
- the role(s) taken in relation to other learners/workers in carrying out tasks

3.1.2 SCQF level Descriptors

The SCQF level Descriptors outline the general outcomes of learning at SCQF levels under five broad headings:

- Knowledge and understanding (mainly subject based)
- Practice (applied knowledge and understanding)
- Generic cognitive skills (eg evaluation, critical analysis)
- Communication, numeracy and IT skills; and
- Autonomy, accountability and working with others

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The Descriptors allow broad comparisons to be made between the outcomes of any learning and allow learners, employers and the public in general to understand the range of skills and learning that should be achieved at each level. SCQF levels are increasingly used in job advertisements to help employers articulate the skills they require for a particular role and to help potential employees to highlight their skills thus ensuring the right person gets the right job.

For SQA Advanced Diploma courses each Unit is also assigned a SCQF level which will be 6, 7 or 8.

These levels indicate the degree of difficulty of the work for that Unit. There are no SCQF level 6 Units within the SQA Advanced Diploma in Computing: Technical Support.

SCQF level 7 is approximately equivalent to first year of degree level study and SCQF level 8 approximately equivalent to second year of degree level study.

SCQF level 7 might be given to an introductory Unit in a subject area and SCQF level 8 to the continuing Unit.

Tutors involved in the delivery and assessment of Units would find the SCQF level Descriptors helpful in determining the appropriate level of difficulty/complexity required.

For example:

The Unit *Client Operating Systems* (HP27 47) has an **SQA Credit value of 2.** This represents 160 hours of teaching and learning.

These 160 hours will equal **16 SCQF points** (1 point = 10 hours of learning) at **SCQF level 7.**

The Unit *Network Server Operating Systems* (HP2W 48) follows on from *Client Operating Systems* (HP27 47) and has an **SQA Credit value of 2.** This represents 160 hours of teaching and learning.

These 160 hours will equal **16 SCQF points** at **SCQF level 8**.

This means that the Unit will take the same time to study and will progress the learning to a higher level.

The Unit *Technical Support: Supporting Users: Hardware* (HP31 47) has an **SQA Credit value of 1.**

This represents 80 hours of teaching and learning.

These 80 hours will equal **8 SCQF points** (1 point = 10 hours of learning) at **SCQF level 7.**

The Unit *Providing Technical Support to Users* (HP35 48) follows on from *Technical Support: Supporting Users: Hardware* (HP31 47) and has an **SQA Credit value of 1.** This represents 80 hours of teaching and learning.

These 80 hours will equal **8 SCQF points** (1 point = 10 hours of learning) at **SCQF level 8.**

This means that the Unit will take the same time to study and will progress the learning to a higher level.

3.2 Core Skills

The Core Skills are a group of five skills that are key to learning and working in today's world. Employers have identified Core Skills as those that are most likely to be needed in any work environment. This does not mean that every job will need people who are proficient in all five Core Skills but it does mean that every job will require some level of ability in some or all of these skills.

The five Core Skills are: *Communication**,** Numeracy**,** Information and Communication Technology (ICT)**,** Problem Solving* and *Working with Others**.*** Each Core Skill is available at levels 2 to 6 of the Scottish Credit and Qualifications Framework (SCQF). A brief description of each Core Skill is detailed below. A fuller description of each Core Skill at the SCQF levels 2–6 is available on the SQA's website — **www.sqa.org.uk/international.**

3.2.1 Communication

Communication skills underpin almost all personal, social, learning, and working activity. They are essential in clarifying one's own thoughts, in interacting and conversing with others, in expressing thoughts and in conveying information, feeling and opinions.

The Core Skill in *Communication* has two components:

- Oral Communication
- Written Communication

3.2.2 Numeracy

Numeracy skills are necessary for coping with the demands of everyday life, including work and study. People need to be comfortable with numbers, and with graphs, symbols, diagrams and calculators.

The Core Skill in *Numeracy* has two components:

- Using Graphical Information
- Using Number

3.2.3 Information and Communication Technology (ICT)

Information and Communication Technology (ICT) focuses on the ability to use Information Technology (IT) to process information in ways which will be useful in work and in the home — it is not about developing IT specialists.

The Core Skill in *Information and Communication Technology (ICT)* has two components:

- Accessing Information
- Providing/Creating Information

3.2.4 Working with Others

Working with Others develops the skills needed to co-operate with others in learning and working situations to identify and achieve shared goals.

The Core Skill in *Working with Others* has two components:

- Working Co-operatively with Others
- Reviewing Co-operative Contribution

3.2.5 Problem Solving

Problem Solving develops the skills needed for tackling issues and problems in personal, social, vocational and occupational contexts.

The Core Skill in *Problem Solving* has three components:

- Critical Thinking
- Planning and Organising
- Reviewing and Evaluating

All qualifications offered by SQA are evaluated against the Core Skill framework and where opportunities exist to develop and/or achieve a Core Skill (embedded), these have been noted and a table is provided for each SQA Advanced Diploma showing where these skills are embedded and/or developed. (See Appendices 1a and 1b).

3.3 Assessment

In the SQA Advanced Diploma in Computing: Technical Support award the focus is on teaching and learning to develop skills within the areas of Computing and in particular Computer Networking. Assessment is a natural part of learning and should be seen as a method of measuring learner progress in a Unit. Assessment amounts to approximately 10% of the overall Unit time allocation in the course.

The reduction in time spent on assessment is an important aim of this award. Assessment will cover a variety of knowledge and practical skills as well as the more intellectual skills of planning and evaluating. These together with the Core Skills mean that a large number of different methods are employed to ensure that a learner 'can do what s/he is supposed to do' and 'knows what s/he is supposed to know'.

A large proportion of Units take a ‘project’ approach using the product of a previous assessment, as the foundation of the next and the purpose is to give the candidate a true reflection of how items being studied integrate and relate to industrial practice. Where this is practical, a holistic approach is encouraged to be taken by centres in assessing across a number of Outcomes within Units or across a number of Units.

The benefit of such so-called ‘cross-assessment’, if it goes well, is the achievement of several Outcomes on several Units with just one assessment instrument. A matching disadvantage is that a failure results in several Units not being achieved. It would be wise for centres to consider separating out the 'retake' assessments of learners who have failed in their first attempt at a composite assessment instrument. It may be possible to combine the delivery of Units in such a way as to create a thematic delivery of the component Units. The ways in which Units may be integrated is left to centres but thematic delivery, as opposed to discrete Unit delivery, may reduce assessment and improve coherence of content.

The normal rules of re-assessment apply to this award. Candidates are normally permitted one re-assessment, or, in exceptional circumstances, two re-assessments at the discretion of the centre.

3.4 Graded Units

In the framework of every SQA Advanced Diploma there are 3 SQA Credits of Graded Unit. There are Graded Units built into the framework towards the latter part of Year 1 and Year 2. Depending on the SQA Advanced Diploma, there may be three individual Graded Units of 1 SQA Credit or there may be two Graded Units — a 1-credit Unit and a 2-credit Unit. The purposes of Graded Units are to:

- demonstrate that the candidate has achieved the principal aims of the Group Award
- demonstrate the candidate’s ability to integrate the knowledge and understanding gained from other Units making up the Group Award
- grade candidate performance

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Graded Units are specific to the Group Award being delivered, and reflect the principal aims of that Group Award. This means that they will also clearly reflect the uniqueness of the title of the Group Award.

The allocation of grades awarded are as follows:

- Grade A — Candidate has achieved a mark of 70% or above
- Grade B — Candidate has achieved a mark of between 60% and 69%
- Grade C — Candidate has achieved a mark of between 50% and 59%
- F (Fail) — Candidate has failed to reach the required standard and achieved a mark less than 50%

4 SQA Advanced Diploma in Computing: Technical Support

4.1 Target audience

The SQA Advanced Diploma in Computing: Technical Support develops skills and knowledge in a range of technical support, server administration, network administration, problem solving, information and communication technology areas and interpersonal skills. The SQA Advanced Diploma in Computing: Technical Support is designed to lead to employment as: IT Support or operations technician, computer installation and maintenance engineer, IT user support technicians, Network Support administrator, or an IT and Telecoms engineer/IT and Telecoms technician.

Successful candidates should be able to progress to a range of degrees.

4.2 Access to the course

As with all SQA qualifications, access will be at the discretion of the centre and the following recommendations are for guidance only. It should be noted that this qualification will be taught and assessed in English.

Some examples of appropriate formal entry qualifications are specified below. They are not exhaustive or mutually exclusive and may be offered in a variety of combinations.

- An appropriate level of skill in the English language.
- Experience in the use of IT applications software.
- Different combinations of relevant National Qualifications, Vocational Qualifications and equivalent qualifications from other awarding bodies may be acceptable, as would suitable industry-standard qualifications at an appropriate level.
- Mature learners with suitable work experience will be accepted for entry provided the enrolling centre believes that the learner is likely to benefit from undertaking the award.

4.3 Aims of course

The SQA Advanced Diploma in Computing: Technical Support award has a range of aims relating to academic and vocational progression.

The principal aim of the award is to prepare the candidates for employment in IT technical support.

The general aims of this award are to:

1 Develop candidates' knowledge and skills in planning, developing and evaluating.
2 Develop employment skills, particularly relating to the IT industry.
3 Enable progression within the SCQF.
4 Develop study and research skills.
5 Develop learning and transferable skills (including Core Skills).
6 Provide academic stimulus.
7 Support candidates' continuing professional development.
8 Update the contents of the award to reflect current professional practices and technologies.
9 Update the contents of the award to incorporate best practice in assessment, including a reduction in time spent on assessment and maximising the use of e-assessment.
10 Maximise flexibility (while maintaining coherence) in qualification design to permit centres to customise the award to their local needs.
11 Reduce the academic level of the award (in terms of SCQF levels).
12 Produce Units that are able to embrace external changes without regular updates.

The specific aims of the award are:

13 Produce Units that are compatible with a wide range of vendors.
14 Prepare learners for employment in an IT or Computing post at technician or professional level in a technical support role.
15 Equip learners with a range of specialist technical support skills and knowledge in the use and support of computer systems.
16 Prepare learners for progression to further study on HE Computing courses.
17 Develop in learners an awareness of professional IT issues such as legal and ethical considerations.

4.4 SQA Advanced Diploma in Computing: Technical Support Framework

The table below shows the whole framework of Units for the SQA Advanced Diploma in Computing: Technical Support and includes their SQA Credit value and SCQF level.

Unit name	Unit code	Credit value	SCQF level
YEAR 1			
Developing Software: Introduction	HP1R 47	1	7
Professionalism and Ethics in Computing	HP29 47	1	7
Computer Systems Fundamentals	HP1T 47	1	7
Troubleshooting Computer Problems	HP1V 47	1	7
Team Working in Computing	HP1X 47	1	7
SQA Advanced Diploma in Computing: Graded Unit 1 (Exam)	HP2A 47	1	7
Client Operating Systems	HP27 47	2	7
Computer Networks: Building Local Area Networks	HP2Y 47	2	7
Mathematics for Computing 1	HP1H 47	1	7
Cloud Computing	HP1Y 47	1	7
Computing: Introduction to Project Management	HP21 47	1	7
Technical Support: Supporting Users: Hardware	HP31 47	1	7
Technical Support: Supporting Users: Software	HP32 47	1	7

YEAR 2			
Software Development: Programming Foundations	HP2P 47	1	7
Security Concepts	HX00 47	2	7
Network Server Operating Systems	HP2W 48	2	8
Network Technology and Data Communications	HP2X 48	2	8
Providing Technical Support to Users	HP35 48	1	8
Open Source Operating Systems: Introduction to Command Line Administration	HP33 48	2	8
Open Source Operating Systems: Basic Server Administration	HP34 48	1	8
Managing a Web Server	HP2V 48	2	8
SQA Advanced Diploma in Computing: Technical Support Graded Unit 2 (Project)	HP36 48	2	8

4.5 Core Skills

All of the revised Units within this award have been assessed and validated against the Core Skills framework.

Successful learners will exit from the SQA Advanced Diploma in Computing: Technical Support with the following Core Skills profile:

Core Skill	**Certificated exit level**
Communication	SCQF level 5
Numeracy	SCQF level 5
Information and Communication Technology (ICT)	SCQF level 6
Problem Solving	SCQF level 6
Working with Others	SCQF level 6

A detailed analysis of the Core Skills profile is provided in Appendices 1a and 1b.

4.6 Graded Unit

Learners will take a 1-credit Graded Unit at SCQF level 7 in the first year of the SQA Advanced Diploma Group Award, and a further 2-credit Graded Unit at SCQF level 8 in the second year of the SQA Advanced Diploma Group Award.

The Graded Units take the form of:

SQA Advanced Diploma in Computing: Graded Unit 1 (HP2A 47) Examination at SCQF level 7 —1 SQA Credit

SQA Advanced Diploma in Computing: Technical Support Graded Unit 2 (HP36 48) Project (Investigation) at SCQF level 8 — 2 SQA Credits

Further details are provided in Section 8.3.

5 Course delivery of an SQA Advanced Diploma

5.1 How the course is delivered

All tutors must ensure that they deliver this course using teaching methods that engage learners in 'active learning' to encourage them to participate in the learning activities set. All SQA qualifications are designed to enable learners to develop their knowledge and skills and then they are required to apply this new knowledge/skill to a new situation. Criterion-referenced assessments assume that all parties are fully informed of the criteria that candidates must achieve and the assessment conditions under which the candidates carry out the assessment activity.[3]

To ensure that learners are fully prepared it is essential that tutors provide as many opportunities as possible for learners to be actively engaged throughout the learning process. Learners should:

- be fully informed of the criteria they must achieve
- be offered a range of learning activities to research, analyse and apply new knowledge/skills to new situations
- be offered opportunities to experience the type of activity that they will be required to carry out as part of the summative assessment
- be able to critically evaluate their personal contribution and to receive feedback from the tutor on how to enhance their understanding

Tutors should develop a learning, teaching and assessment plan for each Unit within the course and provide activities that learners should undertake.

Each Unit should have a master folder containing the Unit specification, teaching materials, the teaching and assessment plan along with assessment exemplars and re-assessments. The teaching materials and teaching plan should provide details of activities that learners should undertake. Typically they include activities such as small group/whole class discussion, group problem solving, eg analysing a case study and offering solutions based on the new learning, group project work to find examples, to research new knowledge and to present their findings to their fellow learners.

The following is a list of learning activities but it is not exhaustive:

- Lectures
- Tutorials
- Study packs
- Problem based scenarios
- Case studies
- Group/team work
- Online materials
- IT based teaching materials

[3] For further information about different assessment activities — whether they be for formative or summative purposes, tutors may wish to complete the new online course: Produce HN Assessments for successful prior verification OR read the SQA Guide to Assessment

- Projects
- Quizzes
- Research and presentation of findings to fellow learners
- Role play
- Short-response questions, multiple-choice questions
- Create questions for other learners (with answers), etc

Tutors should consider the nature of the assessment method as well as the assessment content when planning learning activities so that learners are appropriately prepared.

It is the tutor's responsibility to explain to the learners what is required of them and then to direct, encourage, co-ordinate and support learners to complete the activity. It is also the tutor's responsibility to ensure the resources needed are available to the learners. Materials should be reviewed on a regular basis to ensure they are still relevant.

Some activities could require learners to work in pairs or small groups to discuss issues or to solve a given problem. Other activities could require the learner to undertake some independent research out with the classroom and to bring their findings to the next lesson and present this to the class in a report or presentation format. Some Units will require the learner to undertake independent reading and learners should be prepared to discuss key issues within the classroom as organised and led by the tutor.

In practical skills classes, learners should be directed to use practice exercises to enable them to become proficient. Tutors may demonstrate the skill first and then coach the learners individually when unsure. In terms of developing independent learners, in the case of information technology, learners should be encouraged to independently use the online Help facilities within applications. It should be noted that even in practical classes, learners should be encouraged to work in small groups and to support one another as part of the learning process — by explaining to another; a learner has to reformulate and communicate the learning point thus deepening their learning.

When undertaking group work, learners should be encouraged/directed to work with different groups each time they attempt a new task so that they get to know and work with a wide range of individuals. The groups should be given clear task activities. Tutors should note the various roles assigned to the group members and they should set a time limit for the completion of the task.

At the end of each activity tutors should make time to receive feedback from each group so that they can assess knowledge and understanding and use the feedback session to repeat important key points and to clear up any misunderstandings. Tutors must also provide feedback to learners on their performance in activities, etc.

Where centres have access to electronic resources such as Virtual Learning Environments, Blogs, Wikis, etc — tutors/lecturers are encouraged to use these collaborative tools in the learning process.

5.2 Support for learners

All tutors delivering on a course have a collective responsibility to ensure that all learners are supported in a manner that meets their individual needs as they progress through the course.

Each individual tutor has a role to monitor an individual learner's understanding and progress at Unit level and feed comments to the Course Team. At individual Unit level, tutors may wish to use a range of mechanisms to support learners and to establish if learners are progressing well on the course.

6 SQA Advanced Diploma in Computing: Technical Support course delivery

6.1 Teaching plan

The Units that make up this Group Award are listed in Section 6.2 — ***Overview of Units.***

This Section — ***Teaching plan*** — provides a ***suggested*** delivery schedule for the Units and highlights the best way to sequence the Units over two years.

When constructing this teaching plan consideration was given to the following points:

- Year 1 will contain Units which are mainly at SCQF level 7.
- Year 2 will contain Units which are mainly at SCQF level 8 and there should be a natural progression from some of the Units delivered in Year 1 to those being delivered in Year 2.
- Some Units are 2-credit and thought must be given as to whether the Unit should be covered in one semester or across the whole year.
- Finally, the Graded Units completed at the end of Years 1 and 2 are based on some of the mandatory Units. The Units being assessed as part of the Graded Unit, must be delivered and assessed to ensure that sufficient learning will have taken place to enable the learners a fair opportunity at achieving the Graded Unit at an appropriate grade.

Learners will study 15 credits worth of Units in each year. One semester will have 7 credits and one semester 8 credits. The weighting of these Units will depend on the relationship of the relevant Unit with other Units in terms of prior knowledge needed and/or complementary knowledge.

Rationale for the suggested delivery schedule

Two suggested delivery schedules have been given for Year 1 and Year 2 of SQA Advanced Diploma in Computing: Technical Support — Option A and Option B.

The majority of the SCQF level 7 Units have been included in Year 1, so that learners are provided with introductory knowledge and understanding in the subject areas of — Computer and Operating system fundamentals, network and security theory, professional issues, teamworking, project management, and software development.

The majority of the Units in Year 2 are SCQF level 8 Units that will develop on the knowledge and understanding gained in Year 1. Learners will be able to extend their knowledge and skills in Network Technology and Data Communications, Web and Mail Server management, Open Source Operating Systems, and Network and Server Administration.

6.1.1 Year 1: Suggested delivery schedule

Year 1 — Option A

Semester 1	**Semester 2**
Developing Software: Introduction (HP1R 47) — SCQF level 7, 1 SQA Credit	SQA Advanced Diploma in Computing: Graded Unit 1 (Exam) (HP2A 47) — SCQF level 7, 1 SQA Credit
Professionalism and Ethics in Computing (HP29 47) — SCQF level 7, 1 SQA Credit	Mathematics for Computing 1 (HP1H 47) — SCQF level 7, 1 SQA Credit
Computer System Fundamentals (HP1T 47) — SCQF level 7, 1 SQA Credit	Cloud Computing (HP1Y 47) — SCQF level 7, 1 SQA Credit
Troubleshooting Computer Problems (HP1V 47) — SCQF level 7, 1 SQA Credit	Technical Support: Supporting Users: Hardware (HP31 47) — SCQF level 7, 1 SQA Credit
Teamworking in Computing (HP1X 47) — SCQF level 7, 1 SQA Credit	Technical Support: Supporting Users: Software (HP32 47) — SCQF level 7, 1 SQA Credit
Security Concepts (HX00 47) — SCQF level 7, 2 SQA Credits	
Client Operating Systems (HP27 47) — SCQF level 7, 2 SQA Credits	
Computing: Introduction to Project Management (HP21 47) — SCQF level 7, 1 SQA Credit	
Eight Units studied at SCQF level 7, (6 credits completed)	**Seven Units studied at SCQF level 7, (9 credits completed)**

Rationale for Year 1 (Option A)

In this option all the core level 7 Units (HP1R 47, HP29 47, HP1T 47, HP1V 47, and HP1X 47) are completed in Semester 1. These Units are generic to all SQA Advanced Computing courses, and include the Core Skills and concepts which will underpin the rest of the course. The Graded Unit exam (HP2A 47) which tests knowledge and skills included in the core Units is taken in Semester 2. *Computing: Introduction to Project Management* (HP21 47) is also taken in Semester 1 and will help candidates with both *Teamworking in Computing* (HP1X 47) and other Units.

The two level 7 Units *Client Operating Systems* (HP27 47) and *Security Concepts* (HX00 47) are taken over both semesters, allowing more time to complete these 2-credit Units. The remaining single credit level 7 Units are taken in Semester 2, and along with the previous Units will provide an underpinning foundation for the more advanced Units taken in Year 2.

Key features of Year 1 (Option A)

- The core generic Units are completed in Semester 1 providing a sound foundation for the rest of the course
- All subjects necessary for the Graded Unit exam are taken in Semester 1
- 6 credits are completed in Semester 1 which should help to build learners' confidence for Semester 2
- The two double credit level 7 Units are taken over both semesters allowing more time for completion

Year 1 — Option B

Semester 1	Semester 2
Developing Software: Introduction (HP1R 47) — SCQF level 7, 1 SQA Credit	SQA Advanced Diploma in Computing: Graded Unit 1 (Exam) (HP2A 47) — SCQF level 7, 1 SQA Credit
Professionalism and Ethics in Computing (HP29 47) — SCQF level 7, 1 SQA Credit	Mathematics for Computing 1 (HP1H 47) — SCQF level 7, 1 SQA Credit
Computer System Fundamentals (HP1T 47) — SCQF level 7, 1 SQA Credit	Cloud Computing (HP1Y 47) — SCQF level 7, 1 SQA Credit
Troubleshooting Computer Problems (HP1V 47) — SCQF level 7, 1 SQA Credit	Technical Support: Supporting Users: Hardware (HP31 47) — SCQF level 7, 1 SQA Credit
Teamworking in Computing (HP1X 47) — SCQF level 7, 1 SQA Credit	Technical Support: Supporting Users: Software (HP32 47) — SCQF level 7, 1 SQA Credit
Client Operating Systems (HP27 47) — SCQF level 7, 2 SQA Credits	Security Concepts (HX00 47) — SCQF level 7, 2 SQA Credits
Computing: Introduction to Project Management (HP21 47) — SCQF level 7, 1 SQA Credit	
Seven Units studied at SCQF level 7, (8 credits completed)	**Six Units studied at SCQF level 7, (7 credits completed)**

Rationale for Year 1 (Option B)

In this option all the core level 7 Units (HP1R 47, HP29 47, HP1T 47, HP1V 47, and HP1X 47) are completed in Semester 1. These Units are generic to all SQA Advanced Computing courses, and include the Core Skills and concepts which will underpin the rest of the course. The Graded Unit exam (HP2A 47) which tests knowledge and skills included in the core Units is taken in Semester 2. *Computing: Introduction to Project Management* (HP21 47) is also taken in Semester 1 and will help candidates with both *Teamworking in Computing* (HP1X 47) and other Units.

The remaining single credit level 7 Units are taken in Semester 2, and along with the previous Units will provide an underpinning foundation for the more advanced Units taken in Year 2.

The 2-credit level 7 Unit *Client Operating Systems* (HP27 47) is completed in Semester 1, before the 2-credit level 7 Unit *Security Concepts* (HX00 47) is done in Semester 2. As HP27 47 is completed by end of Semester 1 option B has the advantage of allowing for completion of more Units in Semester 1.

Key features of Year 1 (Option B)

- The core generic Units are completed in Semester 1 providing a sound foundation for the rest of the course
- All subjects necessary for the Graded Unit exam are taken in Semester 1
- 8 credits are completed in Semester 1 which should help to build learners' confidence for Semester 2
- All Units are completed inside a single semester

6.1.2 Year 2: Suggested delivery schedule

Year 2 — Option A

Semester 1	Semester 2
Computer Networks: Building Local Area Networks (HP2Y 47) — SCQF level 7, 2 SQA Credits	
Network Technology and Data Communications (HP2W 48) — SCQF level 8, 2 SQA Credits	
Network Server Operating Systems (HP2W 48) — SCQF level 8, 2 SQA Credits	Managing a Webserver (HP2V 48) — SCQF level 8, 2 SQA Credits
Open Source Operating Systems: Introduction to Command Line Administration (HP33 48) — SCQF level 8, 2 SQA Credits	SQA Advanced Diploma in Computing: Technical Support Graded Unit 2 (Project) (HP36 48) — SCQF level 8, 2 SQA Credits
Providing Technical Support to Users (HP35 48) — SCQF level 8, 1 SQA Credit	Open Source Operating Systems: Basic Server Administration (HP34 48) — SCQF level 8, 1 SQA Credit
Software Development: Programming Foundations (HP2P 47) — SCQF level 7, 1 SQA Credit	
Six Units studied: two at SCQF level 7, four at SCQF level 8 (6 credits completed)	**Five Units studied: 1 at SCQF level 7, four at SCQF level 8, (9 credits completed)**

Rationale for Year 2 (Option A)

The Graded Unit *SQA Advanced Diploma in Computing: Technical Support Graded Unit 2* (Project) (HP36 48) is taken in Year 2 Semester 2 to allow the input of skills and knowledge acquired in Year 1 and from the Year 2 Semester 1 Units *Network Server Operating Systems* (HP2W 48), *Open Source Operating Systems: Introduction to Command Line Administration* (HP33 48), and *Providing Technical Support to Users* (HP35 48).

The Open Source level 8 Units are related and there is a natural progression from *Open Source Operating Systems: Introduction to Command Line Administration* (HP33 48) in Semester 1 to *Open Source Operating Systems: Basic Server Administration* (HP34 48) taken in Semester 2.

There should be opportunities for course and assessment integration between *Computer Networks: Building Local Area Networks* (HP2Y 47), and *Network Technology and Data Communications* (HP2W 48) where similar topics are covered.

Key features of Year 2 (Option A)

- Natural progression between Units
- 6 credits are completed in Semester 1 which should help to build learners' confidence for Semester 2
- Key subjects recommended for the Graded Unit project are taken in Semester 1

Year 2 — Option B

Semester 1	Semester 2
Network Technology and Data Communications (HP2W 48) — SCQF level 8, 2 SQA Credits	Computer Networks: Building Local Area Networks (HP2Y 47) — SCQF level 7, 2 SQA Credits
Network Server Operating Systems (HP2W 48) — SCQF level 8, 2 SQA Credits	Managing a Webserver (HP2V 48) — SCQF level 8, 2 SQA Credits
Open Source Operating Systems: Introduction to Command Line Administration (HP33 48) — SCQF level 8, 2 SQA Credits	SQA Advanced Diploma in Computing: Technical Support Graded Unit 2 (Project) (HP36 48) — SCQF level 8, 2 SQA Credits
Providing Technical Support to Users (HP35 48) — SCQF level 8, 1 SQA Credit	Open Source Operating Systems: Basic Server Administration (HP34 48) — SCQF level 8, 1 SQA Credit
Software Development: Programming Foundations (HP2P 47) — SCQF level 7, 1 SQA Credit	
Six Units studied: one at SCQF level 7, four at SCQF level 8 (8 credits completed)	**Four Units studied: one at SCQF level 7, three at SCQF level 8, (7 credits completed)**

Rationale for Year 2 (Option B)

The Graded Unit *SQA Advanced Diploma in Computing: Technical Support Graded Unit 2* (Project) (HP36 48) is taken in Year 2 Semester 2 to allow the input of skills and knowledge acquired in Year 1 and from the Year 2 Semester 1 Units *Network Server Operating Systems* (HP2W 48), *Open Source Operating Systems: Introduction to Command Line Administration* (HP33 48), and *Providing Technical Support to Users* (HP35 48).

The Open Source level 8 Units are related and there is a natural progression from *Open Source Operating Systems: Introduction to Command Line Administration* (HP33 48) in Semester 1 to *Open Source Operating Systems: Basic Server Administration* (HP34 48) taken in Semester 2.

There should be opportunities for course and assessment integration between *Computer Networks: Building Local Area Networks* (HP2Y 47), and *Network Technology and Data Communications* (HP2W 48) where similar topics are covered. The 2-credit level 8 Unit *Network Technology and Data Communications* (HP2W 48) is completed in Semester 1, before the 2-credit level 7 Unit *Computer Networks: Building Local Area Networks* (HP2Y 47) is done in Semester 2. As HP2W 48 is completed by end of Semester 1 option B has the advantage of allowing for completion of more Units in Semester 1. This option also guarantees that all the Group Award mandatory Units are completed by the end of Year 2 Semester 1.

Key features of Year 2 (Option A)

- Natural progression between Units
- 8 credits are completed in Semester 1 which should help to build learners' confidence for Semester 2
- Key subjects recommended for the Graded Unit project are taken in Semester 1
- All Units completed in a single semester
- All mandatory Units completed by end of Semester 1

6.2 Overview of Units

An overview of each Unit delivered in Years 1 and 2 is given below. However, tutors should refer to the Unit specification for full details of the Knowledge and/or Skills to be covered and Evidence Requirements. The Evidence Requirements clearly state the type of evidence required, the standard of evidence required and any conditions of assessment. The Unit specification also contains guidance on the delivery and assessment of the Unit.

Year 1 Units

Developing Software: Introduction — HP1R 47

This 1-credit Unit is designed to enable candidates to develop basic software development skills. The design and implementation of the constructs of programming (variables, sequence, selection, iteration, functions and parameter passing) will be covered in the context of a development environment. Test plans, test cases and program documentation will also be introduced.

This introduction will provide a basis for further study in software development using a range of programming languages.

There are two Outcomes in this Unit

1 Implement and test code to carry out tasks following a given design.
2 Prepare technical documentation in line with good practice.

Throughout this Unit candidates will learn to use tools and techniques for basic software development using a suitable development environment determined such as structured C++ or any other language with a structured development environment. The choice of language will be at the discretion the centre.

Candidates will learn how to code simple tasks and how this code interacts with the system. In addition they will learn to troubleshoot your code so that it runs error free and produces the desired results. This will involve rigorous testing and it is necessary that tutors stress the importance of testing and techniques that can be used and allow candidates to develop skills in testing.

Candidates should be given designs to follow and this should be used to help code solutions.

This Unit is assessed by practical assessment. All theoretical aspects of development should be demonstrated within a practical context.

Content of this Unit is also assessed in Graded Unit 1.

Professionalism and Ethics in Computing — HP29 47

This 1-credit Unit is designed to allow candidates to gain the knowledge and understanding required to carry out the day to day duties and activities required of a computing professional in an ethical manner with due attention to business, society and legal requirements.

The Unit consists of four Outcomes which inter-relate to one another, to assist in development of a knowledge base and understanding of a computing professional's responsibilities in regard to:

- Professionalism in duties carried out within job functions including: the advantages of interacting with professional bodies in computing, the need for Continuous Professional Development, awareness of appropriate/acceptable conduct.
- Contemporary legislative requirements.
- Adherence to appropriate ethical conduct.
- Understanding of potential for and resolution of ethical conflict.

The four Outcomes in this Unit are:

1 Describe professional bodies relevant to the computing profession.
2 Apply principles of codes of conduct relevant to the computing profession.
3 Describe contemporary legislative concerns for computing professionals.
4 Evaluate ethical considerations in a relevant vocational context.

The knowledge gained through researching the areas included in the Unit will enable candidates to approach future job roles in the computing profession in a responsible and ethical way.

Successful completion of the Unit will be achieved by submission of a single assignment based on questions related to a case study/ scenario of a real business situation.

The case study which will form the basis of the assignment should be available to candidates early in the Unit scheduling and as a tutor you should allow candidates to ask questions to clarify their understanding of the details of the case study/scenario issued.

Content of this Unit is also assessed in Graded Unit 1.

Computer Systems Fundamentals — HP1T 47

This 1-credit Unit is designed to provide candidates with knowledge about the fundamentals of computer systems and focuses on how the various software and hardware elements interact. The Unit has three main areas, the physical and software elements of a computer system, the number systems and logic used within a computer system and the installation of various types of software. The first two areas are theoretical and the third area is practical.

There are three Outcomes in this Unit:

1 Explain the purpose of the elements of a computer system.
2 Manipulate and explain the uses of number and logic systems used in a computer.
3 Install a range of computer software.

Outcome 1 develops knowledge on the ways in which the central processing Unit communicates with memory and input output devices. Communication channels such as busses will also be covered. This also covers the layers of the operating system. Computer memory can be of many types and you will learn to distinguish the features of different types of memory. Computer software will cover different types of operating systems, application and security software as well as file systems and structures. Some of the many ways to secure a computer system such as rights, permissions and security software will be introduced.

The main focus of Outcome 2 is in the application of number systems and logic. This introduces binary and hexadecimal number systems and operations such as add and subtract in these systems and to convert between these systems and decimal numbers. This also covers computer logic and the applications in which it can be used such as using masks in calculating network addresses and changing the case of letters.

Outcome 3 focuses on the practical tasks of installing software. Candidates will have the opportunity to apply the theory that they have learned in Outcome 1 to install operating system, application and security software.

Assessments for Outcomes 1 and 2 may be combined into a single assessment. All assessments are open-book candidates may have access to unlimited notes and online materials.

Content of this Unit is also assessed in Graded Unit 1.

Troubleshooting Computing Problems — HP1V 47

This 1-credit Unit is designed to provide the skills required to develop a possible solution to a computing problem in the context of computer networking or software development Topics covered will cover how to investigate the problem, plan and implement a solution, test and amend it until the problem is resolved and document each step taken to solve the problem.

There are three Outcomes in this Unit:

1 Investigate a computing problem.
2 Plan and implement a solution to a computing problem.
3 Document the steps taken to resolve a computing problem.

In the first Outcome candidates will learn how to investigate a computing problem. This will cover approaches to problem solving, test strategies and techniques and problem solving tools and techniques.

In the second Outcome candidates will learn how to plan and implement a solution to a computing problem. This will cover planning a solution, implementing a solution and testing the solution.

In the third Outcome candidates will learn how to document the steps taken to resolve a computing problem. This will include documenting the investigation, documenting the solution and documenting the testing.

For assessment purposes candidates will be presented with a problem to investigate. The problem will be drawn from one or more of the following areas: networking or software development. Candidates should develop skills in troubleshooting naturally occurring problems that they may encounter during their course. Candidates should be shown how to approach the diagnosis in a logical manner and completed relevant documentation. Documentation could take the form of error logs, test logs or any other appropriate form.

Content of this Unit is also assessed in Graded Unit 1.

Team Working in Computing — HP1X 47

This 1-credit Unit will provide the opportunity to develop effective skills for team working in the context of computing. Candidates will develop co-operative working skills which will include negotiation of goals, roles and responsibilities in the development of a team based Information and Communication Technology (ICT) project. Candidates, both individually and as a team, will present the project Outcomes within the timescale prescribed by the team. Individual progress will be tracked against a project plan and the team will develop skills in updating the plan to ensure that the project is delivered on time. Individual team members will contribute to any necessary research and to documentation of the group's activities.

Candidates will also develop skills in evaluation and will be required to critically evaluate the contributions of themselves and fellow team members.

This Unit is aimed at developing the necessary skills for effective team working within the computing industry.

There are three Outcomes in this Unit:

1 Effectively participate in planning and organising a co-operative ICT project.
2 Participate in the management of a co-operative ICT project and research and carry out agreed project tasks against the schedule and within the remit of the project role.
3 Review own and group skills demonstrated throughout the co-operative ICT project.

SQA Advanced Diploma in Computing: Graded Unit 1 (Exam) — HP2A 47

This 1-credit Unit is designed to assess a candidate's knowledge of key facts and concepts relating to computing. The assessment is a written examination lasting 3 hours.

This Unit is the only one in SQA Advanced Diploma Year 1 Computing that is graded; all other Units are simply assessed on a pass/fail basis. Candidates must achieve at least 50% to be awarded a pass. The grading is carried out as follows:

A = 70%–100%
B = 60%–69%
C = 50%–59%

The examination will be taken under supervised conditions. Candidates are not permitted to bring any reference material into the examination room. Calculators are not permitted.

The question paper consists of three sections. Each section uses different types of questions and assesses different knowledge and skills.

Section 1

This section is worth 15% of the total marks and consists of 15 multiple-choice or multiple-response questions with each question being worth 1 mark. This section covers:

Computer Systems Fundamentals (five questions worth 1 mark each)

Developing Software: Introduction (five questions worth 1 mark each)

Professionalism and Ethics in Computing (five questions worth 1 mark each)

Section 2

This section is worth 15% of the total marks and consists of one written response integrated question covering two or more of the topics listed in Section 3. Candidates must attempt this question.

Section 3

This section is worth 70% of the total marks and consists of written response questions. There are eight questions which cover individual Units and are each worth 10 marks. Candidates should answer any seven of the eight 10 mark questions. This section covers:

Computer Systems Fundamentals (two questions worth 10 marks each)

Developing Software: Introduction (two questions worth 10 marks each)

Professionalism and Ethics in Computing (two questions worth 10 marks each)

Troubleshooting Computing Problems (two questions worth 10 marks each)

There is no minimum score in any section.

Client Operating Systems — HP27 47

This 2-credit SQA Advanced Unit at SCQF Level 7 is designed to develop an understanding of the issues involved in installing and administering a client operating system.

On completion of the Unit candidates should be able to:

1 Install a client operating system.
2 Administer resources.
3 Implement, manage and troubleshoot hardware devices and drivers.
4 Monitor and optimise system performance and reliability.
5 Configure and troubleshoot the desktop environment.
6 Implement network protocols and services.
7 Implement, monitor and troubleshoot security.

In the first part of the course, candidates will study manual and automated installation of client operating systems, upgrading from older versions, applying post-installation upgrades and troubleshooting installation problems.

The second section covers implementing and administering resources, including monitoring, managing, and troubleshooting access to files and folders (including shared folders), connecting to local and network print devices and configuring and managing file systems.

The third section covers implementing, managing and troubleshooting hardware devices and drivers. This includes disk devices, display devices, input and output (I/O) devices, updating drivers and monitoring and configuring multiple processing Units.

The fourth section covers monitoring and optimising system performance and reliability, including monitoring, optimising and troubleshooting system performance, managing and troubleshooting the use of offline files, managing hardware profiles and recovering system and user data.

The fifth section covers configuring and managing user profiles, managing applications by using automatic installation software, configuring and troubleshooting desktop settings and configuring and troubleshoot accessibility services.

The sixth section covers implement network protocols and services, including configuring and troubleshooting the TCP/IP protocol, connecting to computers by using a web browser and configuring, managing and troubleshooting a firewall.

The final section covers implementing, monitoring and troubleshooting security, including configuring, managing and troubleshooting file encryption, security configuration, local security policy, local user and group accounts and web browser security settings.

Mathematics for Computing 1 — HP1H 47

This is a 1-credit Unit which teaches methods that are very useful for candidates who want to be programmers. While the Unit begins from first principles, in practice the contents are too much for someone to learn in the hours that will normally be allocated. Candidates should have a foundation mathematics or numeracy qualification as a pre-requisite to this Unit. This Unit covers mathematical methods and skills appropriate to computing.

There are four Outcomes in this Unit:

1 Demonstrate an understanding of scientific notation and manipulate numbers in scientific notation.
2 Demonstrate an understanding of co-ordinate systems and vectors, and apply linear transformations.
3 Demonstrate a knowledge of simple functions and the ability to perform basic algebraic operations.
4 Demonstrate the application of Boolean algebra to problem situations.

In the first Outcome, candidates will learn about scientific notation and rounding. This is important because it is similar to the way computers store numbers. When programming, candidates need to be aware of what is happening in the computer memory when declaring variables.

The second Outcome covers Co-ordinates and transformations. These are the skills required to create computer graphics.
Outcome 3 focuses on functions and algebra. This is useful when you have to use a computer to perform calculations or manipulate numbers.

In Outcome 4, candidates will be introduced to design with logic gates. Computers are based entirely on logic gates and seeing how a few gates can be combined to perform a useful function gives a good insight into the workings of a computer.

This Unit may be assessed either by four separate 45-minute open-book tasks, or by a single set of questions for the whole Unit, which may be given out one week in advance of the submission deadline. In all cases, the assessment instruments should be in the context of computing and presented as a problem situation. Whichever assessment method is adopted, the candidate should attain a minimum of 60% of the available marks for each Outcome to reach the standard required for a pass.

Computing: Introduction to Project Management — HP21 47

This 1-credit Unit will enable candidates to develop the basic knowledge and skills required to plan, implement, monitor, manage and report on a small scale project.

There are three Outcomes in this Unit:

1 Understand Project Management terminology.
2 Plan and implement a project plan.
3 Monitor, manage, and report change of cost/quality/time impact on a project.

Outcome 1 will cover many of the fundamentals of project management such as the terminology of project management; the range of skills required by project managers; the stages of the project management development cycle; software available to assist the management of projects.

To aid fuller understanding of critical path analysis it would be advisable to show/demonstrate/worked examples of how critical path analysis is carried out manually.

Discussions on project management methodologies could encompass any of the following examples (Agile, Prince2, Waterfall, ITIL, Rapid Application Development RAD, Software Development Life Cycle SDLC, PMBOK).

In Outcome 2 candidates will learn how to plan the development and progress of a project by scheduling the phases and tasks, including resources (human and physical), milestone points, team meetings, and identifying critical and non-critical tasks. This may be achieved either manually or by making use of suitable software.

In Outcome 3 candidates will be required to modify an existing project schedule in response to an external influence (cost/time/quality change). After modification they will be expected to integrate the effects of the changes into suitable documents that could facilitate effective communication to project stakeholders.

Outcomes 2 and 3: These Outcomes should be delivered in a practical fashion, ensuring that points of learning are maintained throughout the Outcomes. Candidates should be encouraged to work with project specifications and use these to learn about the various aspects of project management. Outcome 3 is likely to create a significant amount of problem solving.

Cloud Computing — HP1Y 47

This 1-credit Unit is aimed at providing candidates with a broad knowledge base in the essentials of cloud computing along with conceptual understanding of the elements associated with cloud computing.

On completion of this Unit, candidates should be able to:

1 Identify and describe cloud computing fundamentals.
2 Identify and describe different cloud delivery and deployment models.
3 Devise and implement a cloud strategy for a small to medium sized enterprise.

Outcome 1 is aimed at introducing candidates to the fundamentals of cloud computing, including the identification of IT components and how they map to hardware and software elements found in the cloud. Candidates are also asked to identify the basics of virtualisation.

Outcome 2 is geared more towards the operational aspects of cloud computing and introduces candidates to the different cloud computing services and how they are deployed.

Outcome 3 deals with candidates devising a strategy for moving to the cloud, examining the security and management aspects of cloud computing, identifying cloud vendors as well as demonstrating the practical elements of cloud computing.

Technical Support: Supporting Users: Hardware — HP31 47

This 1-credit Unit is designed to provide with the opportunity to develop skills that will enable candidates to become efficient and effective in an entry level technical support role. It achieves this by providing the soft skills demanded by the industry. Candidates will gain valuable experience through peer evaluation in role play scenarios and real life customer service exposure. Skills will be developed in standard techniques and methods of extracting information from users and others with a various levels of computing experience. Candidates are required to analyse this information in relation resolving the problem, identify an appropriate troubleshooting strategy and provide an effective solution which is appropriately documented.

There are three Outcomes in this Unit:

1 Communicate effectively, with users and others, in a problem solving/ troubleshooting environment.
2 Safely maintain and dispose of hardware.
3 Identify, Install and Configure Hardware Components.

Candidates will investigate the requirements for safe working practices and the legal responsibilities in relation to themselves, peers and clients. They will also investigate common hazardous substances technical support personnel may be exposed to in their daily job. Electrical safety will be demonstrated and explained in a computing context to enable safe working practices. A selection of maintenance and diagnostic tools will be used for common situations encountered in computing. These tools will be discussed and analysed for best use scenarios.

A practical approach is continued to the installation and maintenance of a variety of computer systems and components. Candidates will be expected to research and identify relevant information and techniques to carry out tasks which are unfamiliar. Desktop and mobile technologies will be covered through a variety of resources such as video and/or demonstration for difficult to source technologies or emerging technologies.

The Unit is intended to be practical in nature and to provide candidates with many opportunities to refine an entire skill set at entry level technical support roles. It is designed to build on previous learning but does not precluded direct entry at this level.

The rapid evolution of technology will be a constant challenge to technical support personnel. This Unit aims to help candidates to gain skills to keep pace with this evolution.

Technical Support: Supporting Users: Software — HP32 47

This 1-credit Unit is designed to provide the opportunity to acquire skills that will enable candidates to become efficient and effective in an entry level technical support role. It achieves this by providing the soft skills demanded by the industry. Candidates will gain valuable experience through peer evaluation, in role play scenarios and real life customer service exposure.

There are three Outcomes in this Unit:

1 Communicate effectively, with users and others, in a problem solving/troubleshooting environment
2 Software Considerations
3 Configure and Maintain Software

Candidates will be introduced to standard techniques and methods of extracting information from users and others, with a various levels of computing experience. They will be required to analyse this information in relation to resolving a problem, identify an appropriate troubleshooting strategy and provide an effective solution which is appropriately documented.

Candidates will investigate the requirements for legal responsibilities in relation to all types of software. They will also investigate common software problems and their solutions, and use a selection of maintenance and diagnostic tools encountered for software. These tools will be discussed and analysed for best use scenarios.

The practical approach is continued with remote troubleshooting and problem resolution. Candidates will be expected to research and identify relevant information and techniques to carry out tasks which are unfamiliar. Desktop and mobile technologies will be covered through a variety of resources such as video and/or demonstration for difficult to source technologies or emerging technologies.

The Unit is intended to be practical in nature and provides many opportunities to refine an entire skill set at an entry level technical support role. It is designed to build on previous learning and experience but does not preclude direct entry at this level.

The rapid evolution of technology will be a constant challenge to technical support personnel. This Unit aims to help candidates to gain skills to keep pace with this evolution.

Security Concepts — HX00 47

This 2-credit Unit is designed to introduce candidates to the issues involved in designing and constructing secure contemporary computer networks and is aimed at candidates undertaking an SQA Advanced in Computing with Networking or Technical Support that require an understanding of the concepts underpinning network security.

On completion of the Unit the candidate should be able to:

1 Demonstrate network security, compliance and operational security.
2 Identify and describe threats and vulnerabilities.
3 Implement basic application, data, host security and access control mechanisms.
4 Identify suitable methods of cryptography.

There are four Outcomes in this Unit:

Outcome 1 focuses on the fundamentals of network security and design, devices, ports, protocols, risk management concepts disaster recovery and environmental controls.

Outcome 2 focuses on threats and vulnerabilities such as malware, spyware, social engineering techniques, penetration testing and the tools that can be used for security threat avoidance and ethical hacking techniques.

Outcome 3 focuses on application, data, host and access control mechanisms along with authentication services, operating system security controls account and password management.

Outcome 4 focuses on cryptographic methodologies such as cryptographic tools public key/private key infrastructure, digital signatures, certificate management and data encryption tools and techniques.

There will be one closed-book restricted-response assessment covering all Outcomes. Candidates will be presented with a total of 50 questions and expected to answer 60% of these correctly. They will also be expected to keep a log book, or

equivalent, recording the practical tasks they have carried out during the Unit. They must satisfy the requirements for these assessments in order to achieve the Unit.

This Unit may assist candidates in preparing for CompTIA examination SY0-301: Security+. Vendor certifications can change rapidly and candidates should be encouraged the check the current details at www.comptia.org to ensure that all objectives have been covered.

Year 2 Units

Computer Networks: Building Local Area Networks — HP2Y 47

This 2-credit Unit is designed to enable candidates to work effectively in a network installation or technical support role. It prepares candidates for this task by providing the underpinning knowledge required to understand the operation of modern network equipment and software as well as health and safety issues, industrial practice and standards. Candidates will then gain practical experience is implementing typical networks using industry-standard equipment and protocols, leading onto interconnecting networks at both the physical and logical levels, including routing and basic firewall implementation.

There are two Outcomes in this Unit:

1 Describe Local Area Network devices, media, protocols, and safety issues.
2 Design and build Local Area Networks.

There are two assessments. The first is a multi-choice assessment that tests candidates' knowledge of Local Area Network devices, media, protocols, and safety issues. The minimum pass mark is 60%. The second contains a series of short assignments testing practical abilities, and requires candidates to produce short design reports and complete a number of pro forma log sheets to document their practical work.

Software Development: Programming Foundations — HP2P 47

This 1-credit Unit introduces candidates to generic fundamental programming constructs which are required as a base for software development. The Unit should also expand and consolidate the skills learned in the Unit *Developing Software: Introduction* by introducing the importance of programming/scripting within computing. The Unit will allow candidates to understand the importance of good design and good programming practices within programming. The candidates should consolidate basic programming skills and introduce more complex programming program structures. The candidates should be able to demonstrate understanding of the concepts of modularity, parameter passing and objects.

On completion of the Unit the candidate should be able to:

1 Identify different scenarios to apply programming constructs.
2 Make appropriate use of basic programming constructs.
3 Use advanced programming constructs appropriately.

Network Server Operating Systems — HP2W 48

This 2-credit Unit develops an understanding of Network Server Operating Systems. It is designed to develop an understanding of the issues involved in installing and administering a desktop operating system.

There are four Outcomes in this Unit:

1 Install and upgrade a network operating system.
2 Manage and maintain physical and logical devices.
3 Manage users, computers, groups, files and folders.
4 Manage and maintain a server environment.

The first Outcome covers the principles and practice of deploying network operating system software. On completion of this Outcome, a candidate should be able to deploy an operating system from the distribution media. It may allow for a candidate to be capable of installing an operating system remotely using a pre-configured image or server-based distribution service. Candidates should also be capable of upgrading from a previous version of an operating system to a current version and of patching an operating system in order to keep it current and secure.

The second Outcome looks at managing and maintaining physical and logical devices, including managing hard disk subsystems, monitoring server hardware, optimising server disk performance, installing and configuring server hardware devices.

The third Outcome covers managing users, computers and groups, including managing user profiles, creating and managing and troubleshooting user and computer accounts, and creating and managing groups. It also covers managing and maintaining access to resources, including configuring access to shared folders, troubleshooting terminal services and configuring file system permissions.

The final Outcome covers managing and maintaining a server environment, including monitoring and analysing events and system performance, managing software updates and site licensing, managing servers remotely, monitoring file and print servers, monitoring and optimising application performance and managing a web server. It also covers managing and implementing disaster recovery, performing system recovery for a server, managing backup procedures, recovering from server hardware failure, restoring backup data and scheduling backup jobs.

There will be one or more closed-book restricted-response assessments covering all Outcomes. Candidates will be presented with a total of 40 questions and expected to answer 60% of these correctly. They will also be expected to keep a logbook, video or other recordings providing evidence of the practical tasks they have carried out during the Unit. They must satisfy the requirements for these assessments in order to achieve the Unit.

Network Technology and Data Communications — HP2X 48

This 2-credit Unit develops an understanding of modern networking concepts and practice. It is designed to introduce the basic concepts and principles of data communications, and to provide a wide knowledge of the technologies and standards involved in the construction of modern networks.

There are three Outcomes in this Unit:

1 Describe the principles of data communications.
2 Describe the Characteristics of Network Media.
3 Describe the characteristics and construction of Wide Area Networks.

This Unit allows candidates to study basic communications principles and be introduced to essential concepts and terminology. This will include basic concepts and terminology of data communications; analogue modulation techniques; digital line coding techniques and multiplexing techniques.

The Unit also covers the basics of Local Area Network topologies and equipment; media characteristics; cabling practice and standards.

The final section covers Wide Area Network concepts; Public Telecommunications Operator services; mobile and broadband services.

Providing Technical Support to Users — HP35 48

The 1-credit Unit is designed to provide candidates with the opportunity to acquire skills that will enable them to become efficient and effective in a technical support role. It achieves this by providing the soft skills demanded by the industry. Candidates will gain valuable experience through peer discussion and case study analysis. They will be introduced to standard concepts and procedures of a technical support system. Candidates will be required to analyse this information in relation to maintaining business continuity, identify an appropriate response and plan strategy to provide an effective solution.

The Unit will investigate the metrics and responsibilities in relation to technical support systems. Candidates will also investigate common maintenance plans and solutions. These components will be discussed and analysed for best use scenarios.

There are three Outcomes in this Unit:

1 Describe Components of a Technical Support System.
2 Describe Technical Support Procedures.
3 Present findings of Performance Analysis.

Open Source Operating Systems: Introduction to Command Line Administration — HP33 48

This 2-credit Unit will provide the underpinning theoretical knowledge necessary to perform basic command line operations, such as navigate a file structure and manipulate files and processes. The Unit is intended for candidates who will be working in an Open Source OS environment in technical support, or software development, or who would like to gain a practical understanding of operating in a command line environment.

There are three Outcomes in this Unit:

1 Manage Open Source OS Installation, Package Management and System Architecture.
2 Demonstrate an understanding of and use of Open Source commands.
3 Manage Devices, and Open Source Filesystems.

Outcome 1 includes the following:

- Design hard disk layout
- Install a boot manager
- Manage shared libraries
- Use package management tools
- Determine and configure hardware settings
- Boot the system
- Change runlevels and shutdown or reboot system

Outcome 2 includes the following:

- Work on the command line
- Process text streams using filters
- Perform basic file management
- Use streams, pipes and redirects
- Perform basic process management
- Modify process execution priorities
- Search text files using regular expressions
- Perform basic file editing operations using vi

Outcome 3 includes the following:

- Create partitions and filesystems
- Maintain the integrity of filesystems
- Control mounting and unmounting of filesystems
- Manage disk quotas
- Manage file permissions and ownership
- Create and change hard and symbolic links
- Find system files and place files in the correct location

This Unit may assist candidates in preparing for Linux Professional Institute LPIC-1 101 or CompTIA LX0-101 Exam Objectives. Vendor certifications can change rapidly and candidates should be encouraged the check the current details at **www.lpi.org** or www.comptia.org to ensure that all objectives have been covered.

Assessment for the Unit can take the form of credit transfer after successfully passing either the LPIC-1 101 or CompTIA LX0-101 exams. Alternatively assessment could take the form of a centre devised multi-choice/short-response test that satisfactorily covers the Evidence Requirements described in the Outcome section earlier.

Open Source Operating Systems: Basic Server Administration — HP34 48

This 1-credit Unit is designed to develop the basic skills and knowledge to operate a server using an Open Source Operating System environment.

The Unit will provide the underpinning theoretical knowledge necessary to perform basic operations, such as navigate a file structure and manipulate files and processes. The Unit is intended for candidates who will be working in a Unix/Linux environment in technical support, or software development, or who would like to gain a practical understanding of operating a server in an Open Source OS environment.

There are three Outcomes in this Unit:

1 Administer users, system, and desktops.
2 Manage shells, scripts and essential system services.
3 Administer network and configure security.

Outcome 1 includes the following:

- Install and configure X Windows
- Setup a display manager
- Configure accessibility settings
- Manage user and group accounts and related system files
- Automate system administration tasks by scheduling jobs
- Configure localisation and internationalisation settings

Outcome 2 includes the following:

- Customise and use the shell environment
- Customise or write simple scripts
- Manage SQL data
- Maintain system time
- Configure system logging
- Configure Mail Transfer Agent (MTA) client
- Manage printers

Outcome 3 includes the following:

- Demonstrate understanding of TCP/IP
- Configure basic TCP/IP on client
- Troubleshoot basic TCP/IP on client
- Configure client for DNS
- Perform basic security administration
- Configure basic security on client
- Use encryption to secure data

This Unit may assist candidates in preparing for Linux Professional Institute LPIC-1 102 or CompTIA LX0-102 Exam Objectives. Vendor certifications can change rapidly and candidates should be encouraged the check the current details at **www.lpi.org** or www.comptia.org to ensure that all objectives have been covered.

Assessment for the Unit can take the form of credit transfer after successfully passing either the LPIC-1 102 or CompTIA LX0-102 exams. Alternatively assessment could take the form of a centre devised multi-choice/short-response test that satisfactorily covers the Evidence Requirements described in the Outcome section earlier.

Managing a Web Server — HP2V 48

The aim of this 2-credit Unit is to introduce candidates to the complexities of setting up and maintaining an HTTP Web Server. This Unit is suited to those in a technical support role, however would suit those in a technical web development role.

There are four Outcomes in this Unit:

1 Analyse and evaluate the requirements for running a web server.
2 Install and configure a web server.
3 Perform web server maintenance.
4 Implement web server security.

Outcome 1 aims to introduce the theoretical aspects that have to be considered when preparing to investigate and install a web server, including hardware considerations, operating system considerations and additional server features, among others.

Outcome 2 deals with the installation and configuration of the server itself and is aimed at providing the hands on skills in aspects such as differing installation methods, important locations to be found within the server hierarchy as well as core configuration files and the additional features that can be added to the server in order to provide a scalable HTTP web application server capable of handling dynamic technology.

Outcome 3 aims to introduce the aspects involved in maintaining the server. This includes identifying the location of server log files, how to interpret them and the part they play in how statistics are generated. During this Outcome candidates will also become familiar with how to serve multiple websites using virtual hosting techniques and how to manipulate virtual host configuration files along with name resolution methods, as well as using suitable server backup techniques.

Outcome 4 deals with security issues that have to be considered once the server has been implemented and focuses upon the use of SSL and HTTPS, as well as how to generate self-signed certificates and secure files and folders with appropriate permissions.

SQA Advanced Diploma in Computing: Technical Support Graded Unit 2 (Project) — HP36 48

This 2-credit Graded Unit is designed to provide evidence that the candidate has achieved the following principal aims of the SQA Advanced Diploma in Computing: Technical Support:

1 To prepare students for employment in an IT/Computing-related post at technical or professional level in technical or network support.

2 To develop a range of contemporary vocational skills, ie technical computing skills relating to the use and support of IT systems appropriate to employment at technician (or equivalent) level.

This Graded Unit is designed to provide evidence of the candidate's ability to plan, develop, implement and evaluate technical skills gained throughout the course. It does not ask the candidate to prove new skills. During the Unit they will be expected to:

1 Interpret the needs of the project from the brief.
2 Gather information to plan and develop the project.
3 Decide upon and develop a design approach.
4 Carry out the development.
5 Evaluate the product and process.
6 Evaluate their own performance.

The assessment task is a project. The project will be a complex task which involves:

1 Variables which are complex or unfamiliar.
2 Relationships which need to be clarified.
3 A context which may be familiar or unfamiliar.

The Unit will be project based and allow the candidate the flexibility to select from a variety of different projects which are representative of the Technical Support Role, eg the practical implementation of a software deployment project, designing a network topology for a small to medium sized company, producing a report feasibility study on the implementation of IT systems for an organisation or setting up a Service Desk.

The project will be marked out of 100. The mark at each stage of the project takes into account the criteria outlined. Candidates can only progress to the next stage if they have met the minimum Evidence Requirements of the previous stage. At the end of each stage, there will be opportunities for remediation/re-assessment on that particular stage. All allocated marks will be aggregated to arrive at an overall mark for the project. Assessors will assign an overall grade to the candidate for this Graded Unit based on the following grade boundaries.

A = 70%–100%
B = 60%–69%
C = 50%–59%

Candidates must achieve a minimum of:

- 20 marks for the Planning stage
- 20 marks for the Developing stage
- 10 marks for the Evaluating stage

6.3 Opportunities for integration of Units

It is envisaged that where possible centres will deliver this award in an integrative manner to help the candidates appreciate the interconnections between the various subjects.

Integration means identifying opportunities either within a Unit or across Units to deliver and/or assess topics which meet the criteria for either two Outcomes within the same Unit, or two Outcomes — one Outcome from one Unit and one Outcome from another Unit.

For example, in Year 1 it should be possible to integrate into a single assessment Outcomes 1 of the Units *Technical Support: Supporting Users: Hardware* (HP31 47) and *Technical Support: Supporting Users: Software* (HP32 47).

In Year 2 the Unit *Computer Networks: Building Local Area Networks* (HP2Y 47), Outcome 1 deals with Local Area Network theory. Similar material is also covered by Outcome 2 of the Unit *Network Technology and Data Communications* (HP2X 48) so both Outcomes could be assessed by an assessment that covers both.

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Based on the proposed delivery of Years 1 and 2 the following opportunities exist for integration of delivery and/or assessment:

Year 1

Unit code	Unit title	Integration opportunity
HP31 47	Technical Support: Supporting Users: Hardware	There may be opportunities to integrate into a single assessment task Outcomes 1 of both Units HP31 47 and HP32 47
HP32 47	Technical Support: Supporting Users: Software	

Year 2

Unit code	Unit title	Integration opportunity
HP2Y 47	Computer Networks: Building Local Area Networks	Outcome 1 of HP2Y 47 and Outcome 2 of HP2X 48 both cover Local Area Network theory and it should be possible to design a single assessment activity to cover both Outcomes
HP2X 48	Network Technology and Data Communications	

7 Assessment in an SQA Advanced Diploma award

7.1 Assessment in learning and for certification

Assessment is the process of evaluating a learner's learning.

Assessment takes place throughout the learning and teaching processes as well as the final assessment for certification. It can take many forms (for example: practical exercises, case studies, extended response questions) and can be used for different purposes — including identifying prior knowledge, identifying gaps in learning, providing feedback to learners as well as measuring learner attainment.

Assessment as part of the learning process is called **formative** assessment. It provides developmental feedback to a learner and tutors so that they can adjust their plan for future learning. It is not recorded for external purposes. **Formative** assessment is often called 'assessment for learning'.

Summative assessment is carried out for the purpose of certification. Through **summative assessment**, learners provide evidence to demonstrate that they can achieve the Evidence Requirements detailed in the statement of standards of the relevant Unit specification. It is generally undertaken at the end of a learning activity or programme of learning and is used to make a judgement on the learner's overall attainment.

7.2 Assessment planning of an SQA Advanced Diploma

All SQA Advanced Diploma qualifications are **summatively assessed** using a mix of continuous Unit assessment and Graded Unit assessments. It is helpful for learners, the Course Team and the internal verifiers if the Course Team has an overview of when summative assessments are likely to occur. It is, therefore, common practice for a Course Team, prior to the start of course delivery to agree the overall learning, teaching and assessment plan for the course. Part of this process requires tutors to agree when each Unit in the course will be **summatively assessed**.

In situations where Units of a course are being delivered in parallel, it is important that Course Teams make sure that the assessment load placed on learners is manageable, although it is recognised that by its very nature summative assessments will occur towards the end of learning.

7.3 Planning the Unit summative assessment

For each Unit, it is helpful for tutors/assessors to draw up a Unit assessment plan which:

- describes what is to be assessed
- says what assessment methods will be used
- describes how the assessments are to be administered, eg practical, online, etc
- defines opportunities for integrating assessment
- provides a timetable for when the assessment will take place
- notes arrangements that need to be made to take account of additional support needs or prior learning
- describes the measures to be taken to ensure that the evidence produced is authentic and current
- describes how and when requirements for record-keeping and quality assurance processes will be met

7.4 Negotiating summative assessments with the learners

Ultimately, it is up to the tutor to determine when a learner is ready for summative assessment (within the agreed time constraints of the course timetable). A good way of gauging if a learner is ready for assessment is to use a **practice assessment** (a final formative assessment which mirrors the summative assessment in terms of assessment method and an aspect of the Evidence Requirement where appropriate but it must not contain the same task detail as the summative assessment).

The tutor can use this assessment to identify the level of an individual learner's competence and the Outcome can help the tutor determine if the learner is ready to attempt the summative assessment or if the learner still has gaps in knowledge and understanding that need to be addressed through further work.

It is good practice to communicate assessment plans to learners as early as possible in the course so that they know what to expect. A copy of the **proposed Course Assessment Plan** may be given to learners at the start of the course, often during course induction. Thereafter, it is up to each tutor to make sure that learners receive early warning of when assessment is likely to take place.

7.5 Summative assessment exemplars

Assessment exemplars are produced by SQA and are made available to centres for a number of Units in this SQA Advanced Diploma. Assessment exemplars are intended solely for the purpose of assessment of learners against the standards given in the Unit specifications. **They must not be released prior to the assessment or be distributed for any other purpose. It is the centre's responsibility to maintain the security of all assessment exemplars.**

A Unit assessment exemplar will contain:

- details of the conditions under which the assessment is to be carried out
- assessment tasks for each Outcome
- a marking scheme or model answer
- checklists (where appropriate)

It is vital that tutors:

- adhere to the conditions for the assessment, ie open-book, closed-book, controlled conditions
- mark assessments consistently in line with the marking scheme or model answer provided
- keep all assessment exemplars secure so that they can be used for future learner assessments

Once the learner has completed the summative assessment, it is good practice for tutors to mark their learner's work quickly and provide constructive feedback.

8 SQA Advanced Diploma in Computing: Technical Support assessment strategy and plan

8.1 SQA Advanced Diploma in Computing: Technical Support assessment strategy

A guide to the type and number of assessments in each Unit of the SQA Advanced Diploma in Computing: Technical Support is shown below.

<table>
<tr><th></th><th colspan="4">Assessment — Year 1</th></tr>
<tr><td>Unit</td><td colspan="2">Outcome 1</td><td colspan="2">Outcome 2</td></tr>
<tr><td>Developing Software: Introduction

HP1R 47</td><td colspan="4">Open-book
Practical task undertaken in supervised conditions over an extended period of time</td></tr>
<tr><td rowspan="2">Professionalism and Ethics in Computing

HP29 47</td><td>Outcome 1</td><td>Outcome 2</td><td>Outcome 3</td><td>Outcome 4</td></tr>
<tr><td colspan="4">Open-book
Single assessment for Unit relating to a case study and questions covering content of Outcomes
Undertaken supervised conditions over an extended period of time</td></tr>
</table>

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<table>
<tr><th></th><th colspan="4">Assessment — Year 1</th></tr>
<tr><td>Unit</td><td colspan="2">Outcome 1</td><td colspan="2">Outcome 2</td></tr>
<tr><td rowspan="2">Computer Systems Fundamentals

HP1T 47</td><td colspan="2">Outcome 1</td><td colspan="2">Outcome 2</td><td>Outcome 3</td></tr>
<tr><td colspan="3">Open-book
Set of 25 short-response questions covering each bullet point
Supervised assessment lasting 2 hours</td><td>Open-book
Practical task and detailed log
Supervised conditions with no time limit</td></tr>
<tr><td rowspan="2">Troubleshooting Computer Problems

HP1V 47</td><td>Outcome 1</td><td>Outcome 2</td><td>Outcome 3</td><td>Outcome 4</td></tr>
<tr><td colspan="4">Open-book
Investigation carried out and all stages presented in a 1000 word report
Undertaken supervised conditions over an extended period of time</td></tr>
<tr><td rowspan="2">Computing: Introduction to Project Management

HP21 47</td><td>Outcome 1</td><td colspan="2">Outcome 2</td><td>Outcome 3</td></tr>
<tr><td>Closed-book
20 multiple-choice questions
Supervised conditions lasting 1 hour</td><td colspan="3">Open-book
Practical task covering content of Outcomes 2 and 3
Supervised conditions over an extended period of time</td></tr>
<tr><td rowspan="3">Mathematics for Computing 1

HP1H 47</td><td>Outcome 1</td><td>Outcome 2</td><td>Outcome 3</td><td>Outcome 4</td></tr>
<tr><td>Open-book
Set of questions
Supervised conditions lasting 45 minutes</td><td>Open-book
Set of questions
Supervised conditions lasting 45 minutes</td><td>Open-book
Set of questions
Supervised conditions lasting 45 minutes</td><td>Open-book
Set of questions
Supervised conditions lasting 45 minutes</td></tr>
<tr><td colspan="4">OR

Open-book
Set of questions for complete Unit. Candidates may be given questions one week in advance
Supervised conditions with no specified time limit</td></tr>
<tr><td rowspan="2">Team Working in Computing

HP1X 47</td><td>Outcome 1</td><td>Outcome 2</td><td>Outcome 3</td><td>Outcome 4</td></tr>
<tr><td colspan="4">Open-book
Group project over an extended period of time</td></tr>
<tr><td rowspan="2">SQA Advanced Diploma in Computing: Graded Unit 1 (Exam)

HP2A 47</td><td colspan="4">Graded Unit</td></tr>
<tr><td colspan="4">Closed-book
Examination paper lasting 3 hours
Supervised conditions</td></tr>
</table>

<table>
<tr><th></th><th colspan="7">Assessment — Year 1</th></tr>
<tr><td>Unit</td><td colspan="4">Outcome 1</td><td colspan="3">Outcome 2</td></tr>
<tr><td rowspan="3">Client Operating Systems

HP27 47</td><td>Out-come 1</td><td>Out-come 2</td><td>Out-come 3</td><td>Out-come 4</td><td>Out-come 5</td><td>Out-come 6</td><td>Out-come 7</td></tr>
<tr><td>Open-book
Log book
3 out of 5 practical tasks</td><td>Open-book
Log book
2 out of 4 practical tasks</td><td>Open-book
Log book
2 out of 4 practical tasks</td><td>Open-book
Log book
2 out of 4 practical tasks</td><td>Open-book
Log book
2 out of 4 practical tasks</td><td>Open-book
Log book
2 out of 3 practical tasks</td><td>Open-book
Log book
2 out of 3 practical tasks</td></tr>
<tr><td colspan="7">AND
Closed-book 30 restricted-response questions covering all Outcomes
Supervised</td></tr>
<tr><td rowspan="3">Technical Support: Supporting Users: Hardware

HP31 47</td><td colspan="2">Outcome 1</td><td colspan="2">Outcome 2</td><td colspan="3">Outcome 3</td></tr>
<tr><td colspan="2">Practical task
Supervised conditions over an extended period of time</td><td colspan="2">Practical task
Supervised conditions
over an extended period of time</td><td colspan="3">Practical task
Supervised conditions
over an extended period of time</td></tr>
<tr><td colspan="7">AND
Closed-book
40 Multiple-choice questions covering entire Unit content
Supervised conditions</td></tr>
<tr><td rowspan="3">Technical Support: Supporting Users: Software

HP32 47</td><td colspan="2">Outcome 1</td><td colspan="2">Outcome 2</td><td colspan="3">Outcome 3</td></tr>
<tr><td colspan="2">Practical task
Supervised conditions over an extended period of time</td><td colspan="2">Practical task
Supervised conditions
over an extended period of time</td><td colspan="3">Practical task
Supervised conditions
over an extended period of time</td></tr>
<tr><td colspan="7">AND
Closed-book
40 Multiple-choice questions covering entire Unit content
Supervised conditions</td></tr>
<tr><td rowspan="2">Cloud Computing

HP1Y 47</td><td colspan="2">Outcome 1</td><td colspan="2">Outcome 2</td><td colspan="3">Outcome 3</td></tr>
<tr><td colspan="7">Open-book
Case study leading to written report of approximately 1,000 words based on the findings of the practical tasks for all Outcomes.
Supervised conditions over an extended period of time</td></tr>
</table>

<table>
<tr><th>Unit</th><th colspan="4">Assessment — Year 2</th></tr>
<tr><td>Computer Networks: Building Local Area Networks

HP2Y 47</td><td colspan="2">Outcome 1
Closed-book
36 multiple-choice questions
60% pass mark
Supervised, 100 minutes time limit</td><td colspan="2">Outcome 2
Open-book
Practical tasks over an extended period of time</td></tr>
<tr><td rowspan="2">Software Development: Programming Foundations

HP2P 47</td><td>Outcome 1</td><td colspan="2">Outcome 2</td><td>Outcome 3</td></tr>
<tr><td colspan="4">Open-book
Log book, e-portfolio or equivalent showing practical tasks covering content of Unit
Supervised conditions over an extended period of time</td></tr>
<tr><td rowspan="2">Security Concepts

HX00 47</td><td>Outcome 1</td><td>Outcome 2</td><td>Outcome 3</td><td>Outcome 4</td></tr>
<tr><td colspan="4">Closed-book
50 questions restricted-response assessment covering all Outcomes.
60% pass mark.
Supervised, 110 minutes time limit
AND
Open-book
Log book or equivalent showing practical tasks covering content of Unit
Supervised conditions over an extended period of time</td></tr>
<tr><td rowspan="2">Network Server Operating Systems

HP2W 48</td><td>Outcome 1</td><td>Outcome 2</td><td>Outcome 3</td><td>Outcome 4</td></tr>
<tr><td colspan="4">Closed-book
40 questions multi-choice covering content of all Outcomes
60% pass mark.
Supervised, 110 minutes time limit
AND
Open-book
Practical log book for tasks covering content of all Outcomes
Supervised conditions over an extended period of time</td></tr>
<tr><td rowspan="2">Network Technology and Data Communications

HP2X 48</td><td>Outcome 1</td><td>Outcome 2</td><td colspan="2">Outcome 3</td></tr>
<tr><td>Closed-book
30 multiple-choice questions
60% pass mark
Supervised 90 minutes time limit</td><td>Closed-book
20 multiple-choice questions
60% pass mark
Supervised 60 minutes time limit</td><td colspan="2">Open-book
2000 word report</td></tr>
</table>

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<table>
<tr><th>Unit</th><th colspan="4">Assessment — Year 2</th></tr>
<tr><td rowspan="2">Managing a Web Server

HP2V 48</td><td>Outcome 1</td><td>Outcome 2</td><td>Outcome 3</td><td>Outcome 4</td></tr>
<tr><td>Open-book
500 word report</td><td>Open-book
Practical log book for tasks covering content of Outcome
Supervised conditions over an extended period of time</td><td>Open-book
Practical log book for tasks covering content of Outcome
Supervised conditions over an extended period of time</td><td>Open-book
Practical log book for tasks covering content of Outcome
Supervised conditions over an extended period of time</td></tr>
<tr><td rowspan="2">Providing Technical Support to Users

HP35 48</td><td>Outcome 1</td><td>Outcome 2</td><td colspan="2">Outcome 3</td></tr>
<tr><td>Closed-book
20 extended response questions
60% pass mark
Supervised 60 minutes time limit</td><td>Closed-book
20 extended response questions
60% pass mark
Supervised 60 minutes time limit</td><td colspan="2">Presentation or report with observational checklist covering content of Outcome</td></tr>
<tr><td rowspan="2">Open Source Operating Systems: Introduction to Command Line Administration

HP33 48</td><td>Outcome 1</td><td>Outcome 2</td><td colspan="2">Outcome 3</td></tr>
<tr><td>Closed-book
19 multiple-choice/short-response questions
60% pass mark
Supervised 40 minutes time limit</td><td>Closed-book
26 multiple-choice/short-response questions
60% pass mark
Supervised 50 minutes time limit</td><td colspan="2">Closed-book
15 multiple-choice/short-response questions
60% pass mark
Supervised 30 minutes time limit</td></tr>
<tr><td colspan="4">OR
Closed-book
60 multiple-choice/short-response questions covering all Outcomes
60% pass mark
Supervised 120 minutes time limit</td></tr>
<tr><td rowspan="2">Open Source Operating Systems: Basic Server Administration

HP34 48</td><td>Outcome 1</td><td>Outcome 2</td><td colspan="2">Outcome 3</td></tr>
<tr><td>Closed-book
17 multiple-choice/short-response questions
60% pass mark
Supervised 35 minutes time limit</td><td>Closed-book
20 multiple-choice/short-response questions
60% pass mark
Supervised 40 minutes time limit</td><td colspan="2">Closed-book
23 multiple-choice/short-response questions
60% pass mark
Supervised 45 minutes time limit</td></tr>
<tr><td colspan="4">OR
Closed-book
60 multiple-choice/short-response questions covering all Outcomes
60% pass mark
Supervised 120 minutes time limit</td></tr>
</table>

Unit	Assessment — Year 2
SQA Advanced Diploma in Computing: Technical Support Graded Unit 2 (Project) HP36 48	**Graded Unit** Open-book Practical project covering entire content of the Unit Supervised conditions over an extended period of time

8.2 SQA Advanced Diploma in Computing: Technical Support Course Assessment Plan

Suggested course assessment schedules for Year 1 and Year 2 are found in Appendices 2a and 2b.

They are based on two semesters of 17 weeks. If a centre has a different length of semester, or decide to deliver Units in a different order they should amend their schedules accordingly.

8.3 SQA Advanced Diploma in Computing: Technical Support Graded Unit assessments

SQA Advanced Diploma in Computing: Graded Unit 1 (HP2A 47) Examination at SCQF level 7 — 1 SQA Credit

SQA Advanced Diploma in Computing: Technical Support: Graded Unit 2 (HP36 48) Project (Investigation) at SCQF level 8 — 2 SQA Credits

SQA Advanced Diploma in Computing: Graded Unit 1 is a closed-book examination lasting three hours, and comprising three sections. The examination assesses the candidate's critical knowledge and understanding of the topics relating to the specific aims which this Graded Unit is designed to cover. The questions and corresponding marks are designed in accordance with the ranges indicated in the table that follows. However, the overall total mark for the examination is 100.

The question paper consists of three sections, totalling 100 marks (100%).

Section 1 will be worth 15% of the total marks.
Section 2 will be worth 15% of the total marks.
Section 3 will be worth 70% of the total marks.

The sections will be differentiated by content and level of demand which will be reflected in the type of question used in each section.

Section	Type of question	No of questions	Marks per question	Total % marks
1	Selected response	15	1	15%
2	Constructed response	1 (mandatory)	15	15%
3	Constructed response	7 from 8	10	70%

A more detailed explanation of the content of the sections follows in the table below:

Section 1 — Selected response questions		
Key topics	**Level of demand**	**Percentage weighting for each topic**
Computer Systems Fundamentals	Ability to demonstrate fundamental knowledge and understanding introduced in the three Units.	Five questions each worth 1 mark (5% of total)
Developing Software: Introduction		Five questions each worth 1 mark (5% of total)
Professionalism and Ethics in Computing		Five questions each worth 1 mark (5% of total)

Section 2 — Constructed response questions		
Key topics	**Level of demand**	**Percentage weighting for each topic**
Integrated question incorporating at least two of the following Units: ♦ Computer Systems Fundamentals ♦ Developing Software: ♦ Introduction ♦ Professionalism and Ethics in Computing ♦ Troubleshooting Computing Problems	Application, analysis, synthesis and evaluation	One question worth 15 marks (15% of total)

Section 3 — Constructed response questions		
Key topics	**Level of demand**	**Percentage weighting for each topic**
Computer Systems Fundamentals	Knowledge, comprehension, application and analysis	Two questions each worth 10 marks
Developing Software: Introduction	Knowledge, comprehension, application, analysis, synthesis and evaluation	Two questions each worth 10 marks
Professionalism and Ethics in Computing	Knowledge, comprehension, application, analysis, synthesis and evaluation	Two questions each worth 10 marks
Troubleshooting Computing Problems	Knowledge, comprehension, application and analysis	Two questions each worth 10 marks

NOTE — The candidate will choose seven from eight questions in section 3, 70% of the total.

This assessment should take place towards the end of the programme to ensure that candidates have covered the topics which will be assessed within the Graded Unit.

Candidates must achieve at least 50% to be awarded a pass. The grading is carried out as follows:

A = 70%–100%
B = 60%–69%
C = 50%–59%

There is no minimum score in any section.

SQA Advanced Diploma in Computing: Technical Support Graded Unit 2 is a project investigation to be completed on an open-book basis over a period of time.

This Unit covers the integration of a range of knowledge and skills achieved throughout selected Units of the SQA Advanced Diploma. It is recommended prior to undertaking this Group Award Graded Unit that the candidate should have completed or be in the process of completing the mandatory Units related to the specific aims of the award.

The project brief should include a sample of topics and issues selected from the following list of Outcomes from mandatory Units. The assessor may want to consider some suggestions in the table below.

Unit code	**Unit title**	**Topics/Issues**
HP2W 48	Network Server Operating Systems	♦ Manage users, computers, groups, files and folders. ♦ Monitor and maintain servers
HP2X 48	Network Technology and Data Communications	♦ Contemporary IP addressing schemes ♦ Configure, build and test a simple Local Area Network
HP33 48	Open Source Operating Systems: Introduction to Command Line Administration	♦ Demonstrate an understanding of and use of Open Source commands ♦ Manage Devices, and Open Source Filesystems

NOTE: The list of Topics/Issues in the above table is not exhaustive. Depending on the characteristics of the project brief, the assessor may draw Outcomes from other Units in the SQA Advanced framework provided such Units were undertaken by the candidate.

In addition to the integration of knowledge and skills needed to complete the project investigation, candidates will develop their skills in planning, negotiation, research, analysis, time management and problem solving. The Core Skill of *Problem Solving* at SCQF level 6 is embedded and therefore automatically certificated on successful completion of the Unit.

8.4 What happens if a learner does not achieve an assessment?

If a learner fails to demonstrate competence in a summative assessment, it is good practice to communicate this to the learner quickly. Tutors should take time to individually feedback to learners where they went wrong. Having given feedback, tutors should then advise learners on what they need to do to prepare for re-assessment.

The learner then undertakes additional work as discussed with the tutor, this is called remediation. It is when the learner revises class work or practices skills covered in class BEFORE they attempt the re-assessment. It is important that learners do get time to consolidate their knowledge and understanding before being re-assessed.

Re-assessment may take a variety of forms.

- For some assessments, learners may be allowed to provide additional information, eg if a learner has submitted a report based on a piece of independent research, s/he would be allowed to add the missing evidence and resubmit the report. The new information should be highlighted in such a way to show that it had been added, eg underlined, coloured and dated in the margin.
- For practical tasks related to their use of information technology, candidates may be permitted to correct work and resubmit — the original submission and the re-submission should both be kept.
- For multiple-choice, short-response and Graded Units, candidates may be required to attempt a completely new assessment instrument.

Where specific action has to be taken for re-assessment details will be noted in the Unit specification and tutors must be familiar with the Unit specification requirements for re-assessment.

It is important to note that re-assessment does **NOT** always require that candidates complete a full new assessment. Re-assessment may (and often does) allow candidates to re-attempt the part of the Outcome that they have not completed to a standard which meets the Unit specification.

For Units other than Graded Units, SQA provides only **ONE** summative assessment and it is extremely important that centres produce their own **alternativ**e assessments. These assessments can be used for re-assessment purposes.

Once a draft assessment has been prepared by the centre it should first be quality checked by centre staff (internally verified) and submitted to SQA for prior-verification to ensure that it is fit for purpose.[4]

If a candidate fails to reach the pass mark in the *Computing Graded Unit 1* — Examination, then he/she should be allowed to sit an alternative examination before the beginning of the next session to allow progression to Year 2. Candidates must complete all aspects of the new assessment instrument.

[4] For centres wishing support in this process, an online course has been developed — Produce HN Unit assessments for successful prior moderation

9 Quality Assurance

SQA is committed to providing qualifications and support to match the needs of individuals, society and the economy of Scotland and internationally. SQA believes that global interaction in education and training benefits our customers, clients, partners and SQA through the sharing of expertise and experience.

SQA has a balanced portfolio of qualifications that is inclusive, facilitates progression, reflects Scotland's educational, economic, social and cultural needs and changes, and supports education and training worldwide.

SQA works in partnership with our approved centres to achieve our shared goals of excellence and consistency. This ensures that SQA's qualifications continue to meet the requirements all users of our qualifications.

SQA's quality assurance models are designed to ensure that assessment decisions made to national standards are correct and consistent, and that national standards are maintained. We are committed to maintaining an assessment and quality system that is easy to understand, effectively administered, publicly accountable, and cost-effective to operate.

As well as working with centres to manage and enhance the quality of SQA qualifications, SQA routinely monitors its own performance. SQA establishes processes that need to be followed and submit these to regular auditing. This includes systematic evaluation and review of the effectiveness of our quality management processes. SQA also monitors standards across all our qualifications over time, to ensure consistency. Feedback from stakeholders is an integral part of SQA's review activities.

SQA is subject to external audit by a number of agencies, including the Scottish Government.

For assessed qualifications, SQA regularly monitors centres to ensure that they have the resources and expertise to assess candidates against the qualification criteria. (Assessment is where centres use assessment instruments to make decisions about candidates' work. External assessment is where SQA takes on these duties, usually in the form of examinations or externally assessed coursework. Only assessments are subject to quality assurance by verification.)

10 Verification

10.1 Introduction

SQA's quality assurance processes have been developed to ensure that national standards are applied to internally assessed Units or course components.

To maintain the credibility of SQA qualifications, we rely on effective collaboration with centres to ensure national standards are maintained across all qualifications at all levels.

Verification is the procedure that SQA uses to make sure that centres' assessment decisions are valid and reliable and are in line with national standards.

10.2 Why do we need verification?

Verification is one of a range of Quality Assurance measures used by SQA to confirm that:

- centres' assessment decisions are sound (ie valid, reliable and practicable)
- national standards are being uniformly applied
- assessments are accurately and consistently applied across all candidates and levels

This ensures qualifications and certification is credible with all candidates being assessed to a common standard.

10.3 Internal verification

Centres are responsible for the internal verification of their assessments. This means that centres should have an internal verification system — a system of having quality checks in place — which can be operated throughout the centre. Each tutor who is responsible for the assessment of candidates and/or internal verification of candidate material should:

- be made aware of their centre's quality assurance procedures
- comply with these procedures

Centres will appoint staff members to be internal verifiers. Internal verifiers will ensure that assessors apply standards of assessment uniformly and consistently. They should keep records of internal verification activity for external verifiers to access. Examples of records include:

- evidence of planned verification for the semester which conforms to the centre's verification strategy
- minutes of meetings where assessment work is examined and where discussion about acceptable standards is noted and decisions recorded
- internal verification forms showing which candidates' work has been verified and the outcome. Note where an assessor carries out observations, internal verifiers should also observe the assessor
- evidence of discussion and support of assessors, particularly where candidate work has not been accepted by the internal verifier
- evidence of reporting back to the Course Team, any recommendations/actions required and evidence that these are acted upon

10.4 External verification

To ensure national consistency in assessment decisions, SQA appoints experienced teachers/lecturers who have good, recent experience in the delivery and assessment of their subject to carry out external verification in centres. SQA will notify the SQA co-ordinator if your centre has been selected for verification.

SQA wants to encourage centres and staff to see verification in a positive light, as a valuable Quality Improvement tool.

Appendix 1a: Core Skills Year 1[5]

Unit code	Unit title	Communication		Numeracy		ICT		Problem Solving			Working with Others	
		Written Communication	Oral Communication	Using Number	Using Graphical Information	Accessing Information	Providing/Creating Information	Critical Thinking	Planning and Organising	Reviewing and Evaluating	Working Co-operatively with Others	Reviewing Co-operative Contribution
HP1R 47	Developing Software: Introduction							SCQF 6 E				
HP1X 47	Team Working in Computing	SCQF 6 S	SCQF 6 S			SCQF 6 E	SCQF 6 E				SCQF 6 E	SCQF 6 E
HP1V 47	Troubleshooting Computing Problems							SCQF 6 E	SCQF 6 E	SCQF 6 E		
HP1T 47	Computer Systems Fundamentals			SCQF 5 E	SCQF 5 E							
HP29 47	Professionalism and Ethics in Computing	SCQF 6 S	SCQF 6 S			SCQF 6 S	SCQF 6 S					
HP1H 47	Mathematics for Computing 1			SCQF 6 E	SCQF 5 E							

[5]S = signposted, E = embedded (**shade as S — yellow and E — green**)

Appendix 1b: Core Skills Year 2[6]

Unit code	Unit title	Communication		Numeracy		ICT		Problem Solving			Working with Others	
		Written Communication	Oral Communication	Using Number	Using Graphical Information	Accessing Information	Providing/Creating Information	Critical Thinking	Planning and Organising	Reviewing and Evaluating	Working Co-operatively with Others	Reviewing Co-operative Contribution
HP35 48	Providing Technical Support to Users							SCQF 6 S	SCQF 6 S	SCQF 6 S		
HP36 48	SQA Advanced Diploma in Computing: Technical Support Graded Unit 2: Project							SCQF 6 E	SCQF 6 E	SCQF 6 E		

[6]S = signposted, E = embedded (**shade as S — yellow and E — green**)

Appendix 2a: Year 1, Semester 1 — Assessment Plan (Option A)

Unit name\Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Developing Software: Introduction (HP1R 47)															**X* 1, 2**		
Professionalism and Ethics in Computing (HP29 47)														**X* 1, 2, 3, 4**			
Computer System Fundamentals (HP1T 47)										**X* 1, 2**					**X 3**		
Troubleshooting Computer Problems (HP1V 47)															**X* 1, 2, 3, 4**		
Teamworking in Computing (HP1X 47)														**X* 1, 2, 3, 4**			
Client Operating Systems (HP27 47)				**X 1**				**X 2**				**X 3**				**X 4**	
Security Concepts (HX00 47)							**X 1**						**X 2**				
Computing: Introduction to Project Management (HP21 47)													**X* 2, 3**			**X(CB) 1**	

Submission date is shown by an X, X* indicates integrated assessment and Outcomes integrated, X(CB) indicates closed-book.

Appendix 2a: Year 1, Semester 2 — Assessment Plan (Option A)

Unit name\Week	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
SQA Advanced Diploma Computing: Graded Unit 1 (Exam) (HP2A 47)												**X(CB)**					
Technical Support: Supporting Users: Hardware (HP31 47)					**X 1**			**X 2**			**X 3**				**X*(CB) 1, 2, 3**		
Technical Support: Supporting Users: Software (HP32 47)					**X 1**				**X 2**			**X 3**				**X*(CB) 1, 2, 3**	
Cloud Computing (HP1Y 47)															**X* 1, 2, 3**		
Mathematics for Computing 1 (HP1H 47)				**X 1**				**X 2**					**X 3**			**X 4**	
Client Operating Systems (HP27 47)			**X 5**				**X 6**				**X 7**		**X*(CB) 1, 2, 3, 4, 5, 6, 7**				
Security Concepts (HX00 47)				**X 3**					**X 4**					**X*(CB) 1, 2, 3, 4**			

Submission date is shown by an X, X* indicates integrated assessment and Outcomes integrated, X(CB) indicates closed-book.

Appendix 2b: Year 2, Semester 1 — Assessment Plan (Option A)

Unit name\Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Computer Networks: Building Local Area Networks (HP2Y 47)													**X(CB) 1**				
Network Technology and Data Comms (HP2X 48)													**X(CB) 2**				
Network Server Operating Systems (HP2W 48)														**X*(CB) 1, 2, 3, 4**		**X* 1, 2, 3, 4**	
Open Source Op Systems: Intro to Command Line Administration (HP33 48)															**X*(CB) 1, 2, 3**		
Providing Technical Support to Users (HP35 48)					**X(CB) 1**					**X(CB) 2**			**X3**				
Software Development: Programming Foundations (HP2P 47)															**X* 1, 2, 3**		

Submission date is shown by an X, X* indicates integrated assessment and Outcomes integrated, X(CB) indicates closed-book.

Appendix 2b: Year 2, Semester 2 — Assessment Plan (Option A)

Unit name\Week	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
Computer Networks: Building Local Area Networks (HP2Y 47)									**X 2**								
Network Technology and Data Communications (HP2X 48)								**X 3**				**X(CB) 1**					
Managing a Web Server (HP2V 48)				**X 1**			**X 2**			**X 3**			**X 4**				
Open Source Op Systems: Basic Server Administration (HP33 48)														**X*(CB) 1, 2, 3**			
SQA Advanced Diploma Computing: Technical Support Graded Unit 2 (Project) (HP36 48)															**X***		

Submission date is shown by an X, X* indicates integrated assessment and Outcomes integrated, X(CB) indicates closed-book.