5.1 COMPUTER SYSTEMS, COMMUNICATIONS TECHNOLOGY AND INFORMATION MANAGEMENT (SHORT & FULL COURSE MODULE)

Candidates should study a range of applications found in the home, at school and general everyday life, in order to fully understand some of the basic concepts of ICT.

Assessment Unit 1 will address the following subject matter in the context of applications listed below, together with the more theoretical issues from Section 5.2.

Examples of Applications for the Short Course

Newsletters, publicity and corporate image such as business card/letterhead/flyer/brochure

Room layouts, websites, multimedia presentations

Music scores, cartoons

Surveys, address lists, tuck shop records, clubs and society records

Range of CD-ROM material including computer based training/Computer Assisted Learning

Personal finance

School reports

School library

Scientific experiments, electronic timing, environmental monitoring

Turtle graphics, control of lights, buzzers and motors

Automatic washing machines, automatic cookers, toys, central heating controllers, burglar alarms, video recorders/players, microwave ovens, digital watches

Costing of materials, 3D modelling, simulation e.g. flight or driving

Content

- Computer systems: components and types of system
- Input and output devices
- Storage devices and media
- Introductory communications
- Data: types and terminology
- Information management and effects of IT: legal issues, implications, health and safety

5.1.1 Computer Systems: Components and Types of System

(a) Hardware components of a computer system

(b) Software: definition and examples

(c) Laptops/notebooks, palmtops and other portable systems

(d) Desk-top computers

Learning Outcomes

Candidates should be able to:

(i) define hardware, giving examples;

(ii) define software, giving examples;

(iii) describe the difference between hardware and software;

(iv) identify the main components of a general purpose computer: Central Processing Unit, Main/Internal Memory, Input Devices, Output Devices and Secondary/Backing Storage;

(v) describe the difference between portable (including laptops/notebooks and palmtops) and desktop computers.

5.1.2 Input and Output Devices

(a) Input devices: identification and use

(b) Output devices: identification and use

(c) Advantages and disadvantages of different types of input/output device

Learning Outcomes

Candidates should be able to:

(i) identify the following input devices: keyboards, pointing devices (including mouse, touch pad and tracker ball), video digitisers, remote controls, joysticks, magnetic stripes, scanners, digital cameras, microphones, sensors, MIDI instruments;

(ii) identify suitable uses of the input devices in (i) above, stating the advantages and disadvantages of each;

(iii) identify the following output devices: monitors, printers (laser, ink jet and dot matrix), plotters, speakers, control devices (including lights, buzzers, robotic arms and motors);

(iv) identify suitable uses of the output devices in (iii) above, stating the advantages and disadvantages of each;

(v) identify relative purchase costs, running costs, quality and speed of different types of printers.

5.1.3 Storage Devices and Media

(a) Backing/Secondary storage devices and media: different types and uses

(b) Advantages and disadvantages of different types of backing storage media

(c) Importance of backups

(d) Difference between main/internal memory and backing storage

Learning Outcomes

Candidates should be able to:

(i) describe common backing storage media (such as magnetic tape, CD-ROM, floppy disc and hard disc) and their associated devices;

(ii) identify typical uses of the storage media in (i) above;

(iii) describe the comparative advantages and disadvantages of using different backing storage media;

(iv) define the term backup and describe the need for taking backups;

(v) define the difference between main/internal memory and backing storage, stating the relative benefits of each in terms of speed and permanence.

5.1.4 Introductory Communications 

(a) Modems and digital telephone lines

(b) Analogue to digital conversion and digital to analogue conversion

(c) Advantages and disadvantages of using computer networks

(d) User ids and passwords

(e) Communication media

Learning Outcomes

Candidates should be able to:

(i) describe a modem, its purpose and how it is used with analogue telephone lines;

(ii) state why it is not necessary to use a modem when using digital telephone lines;

(iii) state the difference between analogue data and digital data;

(iv) describe the need for conversion between analogue and digital data;

(v) identify the advantages and disadvantages of using common network environments such as the Internet;

(vi) describe what is meant by the terms user ids and passwords, stating their purpose and use;

(vii) identify a variety of communication media such as fax, e-mail, bulletin boards, and tele/video conferencing.

5.1.5 Data: Types and Terminology

(a) Types of data – alphanumeric/text, numeric (real and integer), date, logical/Boolean

(b) Definition of file, record, field and key field

Learning Outcomes

Candidates should be able to:

(i) identify different data types: logical/Boolean, alphanumeric/text, numeric (real and integer) and date;

(ii) select appropriate data types for a given set of data: logical/Boolean, alphanumeric/text, numeric and date;

(iii) describe the terms: file, record, field, and key field.

5.1.6 Information Management and Effects of IT: Legal Issues, Implications, Health and Safety

WO1.1, WO1.2, WO2.1, WO2.2

(a) Software copyright

(b) Hacking

(c) Viruses

(d) Social effects of ICT

(e) Health

(f) Safety

Learning Outcomes

Candidates should be able to:

(i) describe what is meant by software copyright;

(ii) describe what is meant by hacking;

(iii) describe what a computer virus is;

(iv) explain the measures which must be taken in order to protect against hacking and viruses;

(v) describe the changing patterns of employment including areas of work where there is increased unemployment;

(vi) describe the effects of microprocessor-controlled devices in the home including effects on leisure time, social interaction and the need to leave the home;

(vii) describe the use of photo editing software to distort reality;

(viii) describe the effects of variation in computer access and ICT skills between different people;

(ix) describe the capabilities and limitations of ICT and how communications systems have changed our use of ICT;

(x) discuss the issues relating to information found on the Internet, for example unreliability, undesirability and security of data transfer;

(xi) describe the potential health problems related to the prolonged use of ICT equipment, for example RSI, back problems, eye problems and some simple strategies for preventing these problems;

(xii) describe a range of safety issues related to using computers (electrical, heat, light related) and measures for preventing accidents, particularly in the work place such as not overloading electrical sockets, no trailing wires, no food and drink around the computer, installing fire extinguishers etc.

5.2 PRACTICAL SKILLS AND UNDERSTANDING RELATING TO THE USE OF ICT APPLICATIONS (SHORT AND FULL COURSE MODULE)

The purpose of this module is to develop practical skills and understanding of a range of standard application packages. Assessment Module 2 (practical tasks) will assess this module although some of the more theoretical issues will be examined by Assessment Unit 1.

Content

- Word processing, desk-top publishing and other presentation software
- Graphics production and image manipulation
- Spreadsheets, modelling and databases
- Data logging and control software
- Systems tasks and software

5.2.1 Word Processing, Desk-top Publishing and Other Presentation Software

 IT1.1, IT1.2

(a) Common features of a word processor and desk-top publisher

(b) Differences between a word processor and desk-top publisher

(c) Basic tasks and uses of word processors and desk-top publishers

(d) Use basic features of a variety of different types of software used for presenting information in textual, graphical or multimedia format

Learning Outcomes

Candidates should be able to:

(i) identify the common features found in word processors, desk-top publishers and other presentation software such as left/right/full justification, centring, indentation, emboldening, italics, underlining, copy, cut and paste, bullets, numbering, font selection, point size, font highlight and colour, borders, page and line breaks, columns, tabs, tables, spelling and grammar, word count, inserting pictures and drawing or other objects, grouping, ungrouping, layering, sound effects, animation etc;

(ii) identify basic tasks which can be carried out by word processors and desk-top publishers such as letter writing, memos, theses, reports, flyers, brochures, posters, business cards, interactive presentations, web pages etc;

(iii) use basic features of word processors, desktop publishers and other presentation software in order to create documents such as letters, posters, leaflets, essays, interactive (multimedia) presentations.

5.2.2 Graphics Production and Image Manipulation

 IT1.1, IT1.2

(a) Common features of graphics manipulation software

(b) Common features of scanning software

(c) Basic tasks and uses of graphics packages

Learning Outcomes

Candidates should be able to:

(i) identify common features of basic graphics packages, for example: fill, shade, layering, size, orientation, repeating pattern;

(ii) identify basic tasks which can be carried out using graphics manipulation packages including changing the look of scanned, drawn or photographed images;

(iii) identify the features of scanning software;

(iv) use the basic features of a single graphics package to create or modify an image.

5.2.3 Spreadsheets, Modelling and Databases

 N1.1, N1.2, N1.3, N2.1, N2.2, N2.3, IT1.1, IT1.2, IT2.1, IT2.2

(a) Collect/enter data

(b) Verification and validation

(c) Format data

(d) Write rules and formulas

(e) Sort and search data

(f) Create graphs and charts

(g) Features of spreadsheets and databases

(h) Typical tasks for spreadsheets and databases

(i) Use a spreadsheet for a typical modelling task

(j) Use a database for a typical data handling task

Learning Outcomes

Candidates should be able to:

(i) Design and use a data capture form;

(ii) understand the need for validation and verification;

(iii) apply the concepts of validation and verification in a practical context;

(iv) describe the basic features of spreadsheet software such as cells, rows, columns, replication, formatting, formulae, functions, automatic recalculation, sorting and graph creation;

(v) describe the basic features of database software such as fields, records, files, validation, sorting, searching using the Boolean expressions NOT, AND & OR, creation of charts and graphs, different output formats;

(vi) describe how a data model may be used for answering 'what-if' questions and explain the benefit of being able to answer such questions using a data model;

(vii) identify typical tasks for which spreadsheet and other modelling software can be used;

(viii) identify typical tasks for which databases can be used;

(ix) use software to carry out a task which will allow modification of rules and testing of hypotheses;

(x) use data handling software to manipulate and present data.

5.2.4 Data Logging and Control Software

 IT1.1, IT1.2

(a) Data logging

(b) Program instructions

(c) Control of devices

Learning Outcomes

Candidates should be able to:

(i) identify different types of sensor and suitable uses;

(ii) identify the advantages and disadvantages of computerised data logging rather than logging data manually;

(iii) create instructions to respond to data from sensors;

(iv) write a sequence of instructions to control a screen image or external device such as lights, buzzers, sound or turtle, using repeated instructions, procedures and variables as appropriate;

(v) identify typical applications involving the use of control and data logging software.

5.2.5 Systems Tasks and Software

 IT1.1

(a) Interface software

(b) Electronic mail and Internet browsing

(c) Saving, copying and troubleshooting

(d) Other software tasks

(e) Designing, documenting and implementing IT solutions

Learning Outcomes

Candidates should be able to:

(i) describe the basic features of good interface software;

(ii) describe the basic features of an electronic mail package;

(iii) use electronic mail facilities, including attaching documents;

(iv) identify and use basic features of an Internet browser and a variety of CD-ROMs;

(v) search for information using key words, including searching the Internet and CD-ROMs;

(vi) create, edit, save and copy files on a typical computer system;

(vii) carry out basic troubleshooting activities: e.g. solving why a print instruction produced no printout;

(viii) identify tasks that may be carried out using other software e.g. using a Computer Aided Design package for designing a house;

(ix) write a report detailing how a practical solution implemented on the computer relates to a defined task;

(x) document a solution which has been implemented using an appropriate piece of software, for example describing the purpose of the system and how to use it;

(xi) produce annotated evidence that a system, which has been implemented, meets user requirements.