



# Business & Computing Examinations (BCE) LONDON (UK)

## Computer Science Programme Analysis

The development of BCE programmes include extensive market research from the following sources:

- Data from BCE Centre Annual Reports.
- Enquiries received from different stakeholders.
- Email survey from statutory consultees and stakeholder bodies.
- Questionnaire survey from BCE learners.
- Input received during Approved Centres and Corporate companies training seminar.
- BCE discussions and feedback from potential employers.

BCE learners are 18+, classified as follows:

- Holders of General Certificate of Secondary Education (GCSE) intending to obtain a programme for employment or further education.
- Those already in employment furthering their knowledge for promotion or to venture into new fields.
- Corporate Companies approaching BCE directly or Approved Centres for in-house training.
- Those looking for career change.
- Mature adults with no formal programmes.

**Guided Learning Hours** is the entire notional learning hours representing estimate of total amount of time reasonably required for learners to achieve necessary level of attainment for the award of a programme.

Activities that contribute to guided learning hour include:

- Guided Learning
- Independent and unsupervised research/learning
- Unsupervised compilation of a portfolio of work experience
- Unsupervised e-learning
- Unsupervised e-assessment
- Unsupervised coursework
- Watching a pre-recorded podcast or webinar
- Unsupervised work-based learning

Activities that contribute to Guided Learning include:

- Classroom-based learning supervised by a Tutor
- Work-based learning supervised by a Tutor
- Live webinar or telephone tutorial with a Tutor in real time
- E-learning supervised by a Tutor in real time
- Forms of assessment

### Level 4 Certificate in Computer Fundamentals (115 Credits)

On completion on the combined Level 3 Certificate in Information Systems and Level 5 Diploma in Information Technology, learners interested in pursuing computer science, can register for Level 4 Certificate in Computer Fundamentals.

*Why does the programme exist* – Level 4 Certificate in Computer Fundamentals is an entry level for the Computer Science programme. Learners learn about the different programming languages in the market, how programs are written and compiled. Topics include flow chart diagrams, mathematical expressions, conditional expressions, syntax, run-time and logical errors. The programme prepares the ground level for further studies in Computer Science.

*How it fits into the larger programme* – On completion of the Level 4 Certificate in Computer Fundamentals, learners proceed to the Level 5 Diploma in System Design.

*For whom it was designed* – The Level 4 Certificate in Computer Fundamentals is designed for those who complete the Level 3 Combined Certificate in Information Systems and Level 5 Diploma in Information

Technology or equivalence and would like to pursue a Computer Science programme. The Level 4 Certificate in Computer Fundamentals is used as minimum entry requirement for the Level 5 Diploma in System Design.

*How it will benefit learners* – Computing is diverse! There are so many things to learn and Computer Science covers most of them – programming, networking, web and database technology etc.

**Units:**

- HTML Internet Technology
- Computer Fundamentals
- Introduction to Programming
- Qbasic Programming
- Business Maths

**HTML** - HyperText Markup Language (HTML) is a language to specify the structure of documents for retrieval across the Internet using browser programs of the World Wide Web.

**Computer Fundamentals** – application of computers in commercial field, office automation, computer functions and basics of computer hardware, software and programming.

**Introduction to Programming** – programming is instructing a computer to do something with the help of a programming language. The role of a programming language can be described into two ways: *Technical* – is a means for instructing computer to perform tasks. *Conceptual* – is a framework within which we organise our ideas about things and processes.

**QBasic Programming** - QBASIC is a programming language. With a programming language one can tell the computer what one wants it to do. It is a lot like giving someone directions to a location. The computer follows each step and does exactly what it is told. By programming the computer users can solve maths problems, create art or music, and even make office programs.

**Business Maths** - Everything in our world revolves on Maths. Employees who are good in Maths can serve the organisation well.

Unit	Pre-requisite	Core-requisite	Guided Learning Hours ()	Number of Credits
HTML Internet Technology	Basic computing knowledge.	A pass or higher in Certificate in Information Systems or equivalence.	200	20
Introduction to Programming	Basic computing knowledge.	A pass or higher in Certificate in Information Systems or equivalence.	200	20
Computer Fundamentals	Basic computing knowledge.	A pass or higher in Certificate in Information Systems or equivalence.	200	20
QBasic Programming	Basic computing knowledge.	A pass or higher in Certificate in Information Systems or equivalence.	200	20
Business Maths	Basic computing knowledge.	A pass or higher in Certificate in Information Systems or equivalence.	200	20
Coursework (Project) for all units			150	15

<b>Rules of combination:</b>	All units are mandatory
<b>Age Group:</b>	18+
<b>Programme Type:</b>	Vendor/Industry

**HTML Internet Technology Learning Hours Information Sheet**  
[see Diploma in Web Design]

**Introduction to Programming Learning Hours Information Sheet**

Unit Titles		Credits	Notional Learning Hours					Total
			Guided / Contact Learning	Independent Learning	Research Activities / Group Work	Assessment (self/class)	Coursework	
01	Computer organisation and architecture	2.0	8	6	2	2	2	20
02	Computer bits, bytes	2.0	8	6	2	2	2	20
03	The numbering system	2.0	8	6	2	2	2	20
04	Computer programming languages	2.0	8	6	2	2	2	20
05	Sequential, iteration control structures	2.0	8	6	2	2	2	20
06	Conditional control structures	2.0	8	6	2	2	2	20
07	Flowcharting, algorithms and pseudocode	2.0	8	6	2	2	2	20
08	Computer arithmetic operations	2.0	8	6	2	2	2	20
09	Data types, functions and programming	2.0	8	6	2	2	2	20
10	Conditional expressions	2.0	8	6	2	2	2	20
		<b>20.0</b>	<b>80</b>					<b>200</b>

**Computer Fundamentals Learning Hours Information Sheet**

Unit Titles		Credits	Notional Learning Hours					Total
			Guided / Contact Learning	Independent Learning	Research Activities / Group Work	Assessment (self/class)	Coursework	
01	Information system role in organisations	2.0	8	6	2	2	2	20
02	Computer generations	2.0	8	6	2	2	2	20
03	Computer software and filing methods	2.0	8	6	2	2	2	20
04	Elements of telecommunication and networking	2.0	8	6	2	2	2	20
05	Transaction processing concepts and techniques	2.0	8	6	2	2	2	20
06	Decision support system	2.0	8	6	2	2	2	20
07	eCommerce framework functional overview	2.0	8	6	2	2	2	20
08	Computer instruction processing	2.0	8	6	2	2	2	20
09	Computer memory organisation	2.0	8	6	2	2	2	20
10	Computer device registers	2.0	8	6	2	2	2	20
		<b>20.0</b>	<b>80</b>					<b>200</b>

**QBasic Programming Learning Hours Information Sheet**

Unit Titles	Credits	Notional Learning Hours					
		Guided / Contact Learning	Independent Learning	Research Activities / Group Work	Assessment (self/class)	Coursework	Total
01 Qbasic programming environment	2.0	8	6	2	2	2	20
02 Computer data, time and data speed measurement	2.0	8	6	2	2	2	20
03 Arithmetic and Logic Unit (ALU)	2.0	8	6	2	2	2	20
04 Flowchart diagrams symbols	2.0	8	6	2	2	2	20
05 Using flowchart diagrams	2.0	8	6	2	2	2	20
06 Writing programs in Qbasic language	2.0	8	6	2	2	2	20
07 Main processing loops	2.0	8	6	2	2	2	20
08 Using IF/THEN and CASE statements	2.0	8	6	2	2	2	20
09 Read statement	2.0	8	6	2	2	2	20
10 Creating sequential files	2.0	8	6	2	2	2	20
	<b>20.0</b>	<b>80</b>					<b>200</b>

**Business Maths Learning Hours Information Sheet**

[see Certificate in Business Studies & Internet Technology]

## Level 5 Diploma in System Design (135 Credits)

The Level 5 Diploma in System Design is the next level after Level 4 Certificate in Computer Fundamentals. The programme outlines how computer systems are implemented in organisations and prepare the ground work for Advanced Diploma in Computer Science.

*Why does the programme exists* – This programme take learners to the next intellectual level. The objective of this programme is to study current strategies and techniques of systems design and programming. Learners will learn how to use these techniques to analyse and model information system requirements, propose information systems solutions and build an information system that meets an organisation's needs.

*How it fits into the larger programme* – On completion of the Level 5 Diploma, learners can enhance themselves by pursuing the Level 6 Advanced Diploma in Computer Science.

*For whom it was designed* – Learners who complete the Certificate in Computer Fundamentals or holders of equivalent programmes interested in pursuing Computer Science at Diploma level.

*How it will benefit learners* – The Level 5 Diploma in System Design enable learners write improved computer programs, understand networks (vital in today's world) and system life cycle implementation. The system life cycle is one of the most important models in computing. The Level 5 Diploma also prepare learners for the next higher level in Computer Science.

### Units:

- Business Computer Systems
- System Design
- Network Fundamentals
- Pascal Programming
- Operating System Management

**Business Computer Systems** - In the modern workplace, it is imperative that technology works both effectively and reliably. Computer and information system managers play a vital role in the implementation of technology within their organisations. Computer and information system managers plan, coordinate, and direct research and facilitate the computer-related activities of firms. They help determine both technical and business goals in consultation with top management and make detailed plans for the accomplishment of these goals. This requires a strong understanding of both technology and business practices.

**System Design** - Systems are created to solve problems. One can think of the systems approach as an organised way of dealing with a problem. In this dynamic world, the subject of System Design, mainly deals with the software development activities.

**Networking Fundamentals** - Networking Fundamentals is an overview of networking terminology, different network architectures, and focus on the physical components of computer networks, including server and client computers, cabling and connectors, network file sharing, area networks and network types, basic network topologies, network routers, network protocol, Transmission Control Protocol / Internet Protocol (TCP/IP), firewalls, ethernet and network addresses.

**Pascal Programming** – Pascal is an ideal language for preparing for major programming platforms like C, C++, VB and Java. Pascal is an influential imperative and procedural programming language, intended to encourage good programming practices using structured programming and data structuring. Pascal is a purely procedural programming language that was developed in 1971 to teach learners the basic ideas of programming. Named after Blaise Pascal, the philosopher mathematician, it belongs to the ALGOL family of programming languages.

**Operating System Management** – Computer Science is about research. Operating System Management looks at the behind the scenes of how operating systems work internally. It uses technical terms on operating system technical operations; for example how data is written to disk or read from the disk.

Unit	Pre-requisite	Core-requisite	Guided Learning Hours ()	Number of Credits
Business Computer Systems	Basic knowledge of computing terminology.	A pass or better in Certificate in Computer Fundamentals or equivalence.	240	24
System Design	Basic knowledge of computing terminology.	A pass or better in Certificate in Computer Fundamentals or equivalence.	240	24
Network Fundamentals	Basic knowledge of computing terminology.	A pass or better in Certificate in Computer Fundamentals or equivalence.	240	24
Pascal Programming	Basic knowledge of computing terminology.	A pass or better in Certificate in Computer Fundamentals or equivalence.	240	24
Operating System Management	Basic knowledge of computing terminology.	A pass or better in Certificate in Computer Fundamentals or equivalence.	200	20
Coursework (Project) for all units			190	19

<b>Rules of combination:</b>	All units are mandatory
<b>Age Group:</b>	18+
<b>Programme Type:</b>	Vendor/Industry

**Business Computer Systems Learning Hours Information Sheet**

Unit Titles		Credits	Notional Learning Hours					Total
			Guided / Contact Learning	Independent Learning	Research Activities / Group Work	Assessment (self/class)	Coursework	
01	Information system business applications	2.0	8	6	2	2	2	20
02	Information technology	2.0	8	6	2	2	2	20
03	Sustained competitive advantage	2.0	8	6	2	2	2	20
04	Business applications and software	2.0	8	6	2	2	2	20
05	Networking, telecommunication solutions	2.0	8	6	2	2	2	20
06	Database management systems	2.0	8	6	2	2	2	20
07	eBusiness technologies	2.0	8	6	2	2	2	20
08	Business support systems	2.0	8	6	2	2	2	20
09	Electronic commerce systems	2.0	8	6	2	2	2	20
10	Management information system	2.0	8	6	2	2	2	20
11	System development life cycle	2.0	8	6	2	2	2	20
12	IT strategies, architecture and applications	2.0	8	6	2	2	2	20
		<u>2.0</u>	<u>8</u>	<u>6</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>20</u>
		<b>24.0</b>	<b>96</b>					<b>240</b>

**System Design Learning Hours Information Sheet**

Unit Titles		Credits	Notional Learning Hours					Total
			Guided / Contact Learning	Independent Learning	Research Activities / Group Work	Assessment (self/class)	Coursework	
01	Introduction to Systems Analysis	2.0	8	6	2	2	2	20
02	System Life Cycle	2.0	8	6	2	2	2	20
03	System Analysis and Design methods	2.0	8	6	2	2	2	20
04	System development process models	2.0	8	6	2	2	2	20
05	Project Management tools and techniques	2.0	8	6	2	2	2	20
06	Fact-finding techniques	2.0	8	6	2	2	2	20
07	Data modelling tools	2.0	8	6	2	2	2	20
08	The feasibility analysis	2.0	8	6	2	2	2	20
09	System design phase	2.0	8	6	2	2	2	20
10	System input/output requirements	2.0	8	6	2	2	2	20
11	Designing and prototyping user interface	2.0	8	6	2	2	2	20
12	System implementation	2.0	8	6	2	2	2	20
		<u>2.0</u>	<u>8</u>	<u>6</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>20</u>
		<b>24.0</b>	<b>96</b>					<b>240</b>

**Network Fundamentals Learning Hours Information Sheet**

Unit Titles		Credits	Notional Learning Hours					Total
			Guided / Contact Learning	Independent Learning	Research Activities / Group Work	Assessment (self/class)	Coursework	
01	Introduction to networking	2.0	8	6	2	2	2	20
02	OSI Layer model	2.0	8	6	2	2	2	20
03	Physical layer of the OSI model	2.0	8	6	2	2	2	20
04	Data link layer of the OSI model	2.0	8	6	2	2	2	20
05	Network layer of the OSI model	2.0	8	6	2	2	2	20
06	Transport layer of the OSI model	2.0	8	6	2	2	2	20
07	Session layer of the OSI model	2.0	8	6	2	2	2	20
08	Presentation layer of the OSI model	2.0	8	6	2	2	2	20
09	Application layer of the OSI model	2.0	8	6	2	2	2	20
10	LAN topologies	2.0	8	6	2	2	2	20
11	Telephone networks	2.0	8	6	2	2	2	20
12	WAN topologies	2.0	8	6	2	2	2	20
		<b>24.0</b>	<b>96</b>					<b>240</b>

**Pascal Programming Learning Hours Information Sheet**

Unit Titles		Credits	Notional Learning Hours					Total
			Guided / Contact Learning	Independent Learning	Research Activities / Group Work	Assessment (self/class)	Coursework	
01	Pascal programming environment	2.0	8	6	2	2	2	20
02	Variables and sample program	2.0	8	6	2	2	2	20
03	Pascal reserved words	2.0	8	6	2	2	2	20
04	IF, FOR and Repeat until statements	2.0	8	6	2	2	2	20
05	Conditional statements using CASE...OF	2.0	8	6	2	2	2	20
06	Logical operators	2.0	8	6	2	2	2	20
07	Pascal procedures and functions	2.0	8	6	2	2	2	20
08	Processing files in Pascal	2.0	8	6	2	2	2	20
09	Using arrays in Pascal	2.0	8	6	2	2	2	20
10	Using data structures to create records	2.0	8	6	2	2	2	20
11	Reading/writing to a file	2.0	8	6	2	2	2	20
12	Creating a menu	2.0	8	6	2	2	2	20
		<b>24.0</b>	<b>96</b>					<b>240</b>



**Operating System Management Learning Hours Information Sheet**

Unit Titles	Credits	Notional Learning Hours					
		Guided / Contact Learning	Independent Learning	Research Activities / Group Work	Assessment (self/class)	Coursework	Total
01 How operating system controls hardware	2.0	8	6	2	2	2	20
02 Memory management in older systems	2.0	8	6	2	2	2	20
03 Memory management in newer systems	2.0	8	6	2	2	2	20
04 Operating system scheduler	2.0	8	6	2	2	2	20
05 Operating system deadlock problems	2.0	8	6	2	2	2	20
06 Parallel processing	2.0	8	6	2	2	2	20
07 Storage disk device management	2.0	8	6	2	2	2	20
08 File management functions	2.0	8	6	2	2	2	20
09 Distributed access control system	2.0	8	6	2	2	2	20
10 Single user operating systems vs multi-user	<u>2.0</u>	<u>8</u>	<u>6</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>20</u>
	<b>20</b>	<b>80</b>					<b>200</b>

## Level 6 Advanced Diploma in Computer Science (203 Credits)

Computer science is a branch of informational and programming sciences that focuses on different methods of computation, data synthesis, programming, and analysis. It can be applied in a variety of industries such as business, military operations, and engineering and demand for skilled professionals in the field is growing rapidly in today's technologically-driven society. The Level 6 Advanced Diploma in Computer Science prepare learners for further education or employment. With the rapid developments in technology, advances in new computer systems and programs launched daily, Computer Science programme offer many attractive career opportunities in technology and information management. Organisations of all sizes are looking for skilled professionals who hold a Computer Science programme for a variety of critical projects including networking, technical applications, and developing efficient programs and applications. The advantage of Computer Science programme is it touches on a number of fields including programming, networking, software engineering, database technology and management science. The Level 6 Advanced Diploma in Computer Science gives a lot of metadata at the same time, practical skills are implemented as well. Learners who complete the Level 6 Diploma learn much in Computer Science and also find it easy to advance further or diversify totally to different fields.

*Why does the programme exists* – The Level 6 Advanced Diploma in Computer Science is designed to provide in-depth study and analysis of computer programming languages and applications, along with understanding algorithms, advanced computations, and machine language. The programme also explore critical aspects such as systems architecture, database technology, computer engineering, and management science.

*How it fits into the larger programme* – The Level 6 is the highest programme offered by BCE. The programme units are the most recognised topics in computing. The computer science offers a variety of technical, mathematical, and analytical approaches that challenge learners to acquire new skills.

*For whom it was designed* – This programme is designed for Level 5 Diploma in System Design holders or equivalent, interested in further computing studies or advancing themselves academically.

*How it will benefit learners* – The programme concentrates on the most sought after topics in Computer Science, leading to better employment or entrance to further education.

### Units:

- Computer Systems Architecture
- Database Technology
- Management Science
- Data Communications and Networking
- Software Engineering
- C Programming
- Visual Basic .Net Programming

**Computer Systems Architecture** - IT professionals often have to make decisions on what hardware to buy - what is the best value for money in the budget and the client needs. The more one knows about computer architecture, the more informed one is likely to make good decisions. Knowledge of CPU, I/O and multitasking operations is extremely important.

**Database Technology** - The essential feature of database technology is that it provides an INTERNAL representation (model) of the EXTERNAL world of interest. Examples are the representation of a particular date/time/flight/aircraft in airline reservation or of item code/item description/quantity on hand/reorder level/reorder quantity in a stock control system. *Why is it important?* Business in much of the world depends on database technology; from the behind the scenes designs to practical implementation using software programs like Oracle, Windows SQL Server, Ingress, SAP and Sybase. For example: *Finance*: the UK clearing banks have calculated that if their database systems were removed it would take every person in UK working 24 hours per day, 7 days per week to process all the financial transactions manually. The London Stock Exchange relies on computer systems for recording buying and selling of stock which happens very quickly and in large quantities. The amount of money involved in these transactions is enormous. *Transport*: All airlines use online seat reservation systems and have systems for scheduling aircraft, for building and maintaining timetables, for handling the in-flight catering and for mechanical servicing of the planes. Similar systems exist for rail, sea and road transport. They all use database technology extensively. *Utilities*: major utilities (water, electricity, gas) all have generation/distribution systems based on database technology. *Resources*: The mineral

exploration/extraction companies, and governments who regulate them (especially for oil exploration/extraction) have extensive databases which have complex data structures (usually including GIS (Geographical Information System)) components. **Production engineering:** from scheduling workflow through the production lines of machines to stock control and order processing, database technology underpins all activity in this area.

**Environment:** protection and control of the environment by government agencies depend heavily on database systems with GIS facilities, together with databases of toxic substances and clean-up recommendations.

**Tourism:** hotel systems and local tourist attractions, information and booking facilities rely on database systems, and the major package tour operators have extensive databases for holiday planning and booking, together with financial systems for payment and invoicing. **Leisure:** the entertainment industry uses database systems extensively for theatre, concert and cinema ticket bookings. **Culture:** museums, art galleries, history exhibitions - all utilise database technology (and especially multimedia database technology) for cataloguing their collections and recording access to them. **Education:** programmes, materials, and assessment all rely heavily on database technology in all sectors of education. Increasingly the linking of database technology with hypermedia delivery systems allows courseware to be maintained up-to-date and delivered to the consumer. **Healthcare:** healthcare has long relied on database technology to schedule hospital beds or appointments at clinics or doctor's surgery. **Government administration** would be paralysed without database technology; the collection of taxes and the payment of social security benefits depend totally on database technology. **Retail:** the major retail stores utilise database technology in stock control and PoS (Point of Sale) systems. Modern retailers use advanced data mining techniques to determine trends in sales and consumer preference to optimise stock control, retail performance, customer convenience and profit.

**Management Science** - Management Science is a field of study characterised by the use of mathematical and computer models for decision making. Its origins can be traced to Operations Research. Management Science is concerned with developing and applying models and concepts that may prove useful in helping to illuminate management issues and solve managerial problems. Applications of Management Science are abundant in industry and government. Airlines and overnight mail systems use mathematical models to create efficient, dependable flight schedules. The same applies to organisations that use staff shift rosters.

**Data Communications and Networking** - Computer communication and computer networks have become very important areas in the last decade. It is virtually impossible to imagine an important major computer system today that isn't heavily involved in communication. The Internet has grown in size, speed and penetration enormously and changed the working habit of many organisations. The rapid change and expansion of networks have also changed the requirement on the technology used.

**Software Engineering** - Software Engineering is the discipline providing methods and tools for the construction of quality software with a limited budget and a given deadline, in the context of constant requirements change. It involves the elicitation of the system's requirements, the specification of the system, its architectural and detailed design. In addition, the system needs to be verified and validated, a set of activities that commonly take more than 50% of all development resources. Testing techniques and tools, at different levels (unit, integration, system) are needed. Software development being a human intensive process, management and quality control techniques are also required to run successful projects and construct quality systems.

**C Programming** - a popular and widely used programming language for creating computer programs. Programmers around the world embrace C because it gives maximum control and efficiency to the programmer. C was initially used for system development work, in particular the programs that make-up the operating system. C is mainly used because it produces code that runs nearly as fast as code written in assembly language (a low level programming language). C Programming is used to create: operating systems; language compilers; assemblers; text editors; print spoolers; network drivers; modern programs; data bases; language interpreters and utilities.

**VB .NET Programming** - the .NET Framework is Microsoft's application development platform that enable developers to easily create Windows applications, web applications, and web services using a myriad of different programming languages, and without having to worry about low-level details like memory management and processor-specific instructions. Visual Basic is a computer programming system developed and owned by Microsoft. Visual Basic was originally created to make it easier to write programs for the Windows computer operating system. The basis of Visual Basic is an earlier programming language called BASIC that was invented by Dartmouth College professors John Kemeny and Thomas Kurtz. Visual Basic is

often referred to using just the initials, VB. Visual Basic is easily the most widely used computer programming system in the history of software.

Unit	Pre-requisite	Core-requisite	Guided Learning Hours ( )	Number of Credits
Computer Systems Architecture	Good computing knowledge	A pass or better in Diploma in System Design or equivalence.	280	28
Database Technology	Good computing knowledge	A pass or better in Diploma in System Design or equivalence.	340	34
Management Science	Good computing knowledge	A pass or better in Diploma in System Design or equivalence.	220	22
Data Communications & Networking	Good computing knowledge	A pass or better in Diploma in System Design or equivalence.	220	22
Software Engineering	Good computing knowledge	A pass or better in Diploma in System Design or equivalence.	240	24
C Programming	Basic programming skills or basic knowledge of computer use.	A pass or better in Diploma in System Design or equivalence.	220	22
VB .Net Programming	Basic programming skills or basic knowledge of computer use.	A pass or better in Diploma in System Design or equivalence.	300	30
Coursework (Project) for all units			210	21

<b>Rules of combination:</b>	All units are mandatory
<b>Age Group:</b>	19+
<b>Programme Type:</b>	Vendor/Industry

**Computer Systems Architecture Learning Hours Information Sheet**

Unit Titles	Credits	Notional Learning Hours					
		Guided / Contact Learning	Independent Learning	Research Activities / Group Work	Assessment (self/class)	Coursework	Total
01 Computer architecture components	2.0	8	6	2	2	2	20
02 Computing computer numbering systems	2.0	8	6	2	2	2	20
03 Computer data formats, integer data representation and floating point numbers	2.0	8	6	2	2	2	20
04 The von Neumann model	2.0	8	6	2	2	2	20
05 Data structure analysis	2.0	8	6	2	2	2	20
06 Assembly language instruction format	2.0	8	6	2	2	2	20
07 CISC architecture vs RISC architecture	2.0	8	6	2	2	2	20
08 Principles of input/output hardware	2.0	8	6	2	2	2	20
09 Computer peripherals and how they are connected	2.0	8	6	2	2	2	20
10 Physical structure to secondary and tertiary storage devices	2.0	8	6	2	2	2	20
11 Operating system services	2.0	8	6	2	2	2	20
12 Loading and executing programs	2.0	8	6	2	2	2	20
13 File system structure	2.0	8	6	2	2	2	20
14 Computer security threats and attacks	<u>2.0</u>	<u>8</u>	<u>6</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>20</u>
	<b>28.0</b>	<b>112</b>					<b>280</b>

### Database Technology Learning Hours Information Sheet

Unit Titles		Credits	Notional Learning Hours					Total
			Guided / Contact Learning	Independent Learning	Research Activities / Group Work	Assessment (self/class)	Coursework	
01	Relational database model	2.0	8	6	2	2	2	20
02	Using SELECT statement	2.0	8	6	2	2	2	20
03	Using the WHERE clause	2.0	8	6	2	2	2	20
04	Using functions in SQL	2.0	8	6	2	2	2	20
05	Group functions in SQL	2.0	8	6	2	2	2	20
06	Creating and altering tables	2.0	8	6	2	2	2	20
07	Data integrity constraints	2.0	8	6	2	2	2	20
08	System and object privileges	2.0	8	6	2	2	2	20
09	Data constraints	2.0	8	6	2	2	2	20
10	Update command, commit and rollback statements	2.0	8	6	2	2	2	20
11	With read only effects	2.0	8	6	2	2	2	20
12	Creating sequence	2.0	8	6	2	2	2	20
13	Authentication and create session privileges	2.0	8	6	2	2	2	20
14	Reports and formatting output	2.0	8	6	2	2	2	20
15	Database management architecture	2.0	8	6	2	2	2	20
16	Data notations	2.0	8	6	2	2	2	20
17	Normalisation	2.0	8	6	2	2	2	20
		<b>34.0</b>	<b>136</b>					<b>340</b>

**Management Science Learning Hours Information Sheet**

Unit Titles	Credits	Notional Learning Hours						
		Guided / Contact Learning	Independent Learning	Research Activities / Group Work	Assessment (self/class)	Coursework	Total	
01	Assignment allocation (assignment problem)	2.0	8	6	2	2	2	20
02	Transportation problem and allocation of resources	2.0	8	6	2	2	2	20
03	Linear programming	2.0	8	6	2	2	2	20
04	Linear programming (General) 1	2.0	8	6	2	2	2	20
05	Linear programming (General) 2	2.0	8	6	2	2	2	20
06	Simulation, operation and implementation of queues	2.0	8	6	2	2	2	20
07	Dynamic programming 1	2.0	8	6	2	2	2	20
08	Dynamic programming 2	2.0	8	6	2	2	2	20
09	Network diagrams	2.0	8	6	2	2	2	20
10	Decision trees	2.0	8	6	2	2	2	20
11	Stock control	2.0	8	6	2	2	2	20
		<u>2.0</u>	<u>8</u>	<u>6</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>20</u>
		<b>22</b>	<b>88</b>					<b>220</b>

**Data Communications & Networking Learning Hours Information Sheet**

Unit Titles	Credits	Notional Learning Hours						
		Guided / Contact Learning	Independent Learning	Research Activities / Group Work	Assessment (self/class)	Coursework	Total	
01	How data is transformed into electro-magnetic signals	2.0	8	6	2	2	2	20
02	Bandwidth, multiplexing and spreading	2.0	8	6	2	2	2	20
03	Switched networks	2.0	8	6	2	2	2	20
04	Data framing process	2.0	8	6	2	2	2	20
05	Ethernet characteristics	2.0	8	6	2	2	2	20
06	Logical addressing	2.0	8	6	2	2	2	20
07	Internetwork analysis	2.0	8	6	2	2	2	20
08	The concept of host-to-host delivery	2.0	8	6	2	2	2	20
09	Congestion control and quality of service	2.0	8	6	2	2	2	20
10	Hierarchy of a domain name service	2.0	8	6	2	2	2	20
11	The structure of the security protocols	2.0	8	6	2	2	2	20
		<u>2.0</u>	<u>8</u>	<u>6</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>20</u>
		<b>22</b>	<b>88</b>					<b>220</b>

**Software Engineering Learning Hours Information Sheet**

Unit Titles	Credits	Notional Learning Hours					
		Guided / Contact Learning	Independent Learning	Research Activities / Group Work	Assessment (self/class)	Coursework	Total
01 Introduction to software engineering	2.0	8	6	2	2	2	20
02 Activities in software engineering	2.0	8	6	2	2	2	20
03 Classification of software qualities	2.0	8	6	2	2	2	20
04 Software engineering principles	2.0	8	6	2	2	2	20
05 Modularisation techniques	2.0	8	6	2	2	2	20
06 Software requirement specification	2.0	8	6	2	2	2	20
07 Objectives of software testing	2.0	8	6	2	2	2	20
08 Software process models	2.0	8	6	2	2	2	20
09 Managing software engineering projects	2.0	8	6	2	2	2	20
10 CASE tools in software engineering	2.0	8	6	2	2	2	20
11 Evaluating products, processes and resources	2.0	8	6	2	2	2	20
12 Impacts of software engineering on society	<u>2.0</u>	<u>8</u>	<u>6</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>20</u>
	<b>24.0</b>	<b>96</b>					<b>240</b>

**C and VB .Net Programming Learning Hours Information Sheet**

[refer to Diploma in Programming]