

SEVERN BUSINESS COLLEGE

Qualifi Level 5 Extended Diploma in IT-Networking

Course Handbook

Qualification
Qualifi Level 5 Extended Diploma in IT-Networking

Ofqual Number
610/3475/7

Level
5

Total Qualification Time
2400

Credit Value
240

Aim of the Course
The aim of the Level 4 qualifications is to provide learners with the technical skills and knowledge needed to work in the information technology (IT) industry. The qualifications provide the opportunity for individuals to forge a career in IT by seeking a greater knowledge and understanding of the industry, and to support the individual's development into technical positions.
The aim for the Level 5 qualifications is to provide a career path for learners who wish to develop a broad base of knowledge and skills that will enable them to work in a variety of roles in the IT industry, notably in .NET programming, system administration and network security. Learners will learn about entrepreneurship in a techno environment.

Assessment
Assessment is through practical assignments, with no exams - to more accurately reflect the real working environment.

Course Structure

Qualifi Level 5 Extended Diploma in IT-Networking			
Unit number	**Mandatory Units**	**Unit level**	**Unit credit**
L/617/6692	Information Technology and IT Ethics	4	20
R/617/6693	Mathematics and Statistics for IT	4	20
Y/617/6694	PC Maintenance and Operating Systems	4	20
D/617/6695	Computer Graphics Editing and Database Concepts	4	20
H/617/6696	Logical IT Networking	4	20
K/617/6697	Physical IT Networking	4	20
F/617/6740	Technopreneurship	5	20
J/617/6741	Network Security	5	20
L/617/6742	C#.NET Programming	5	20
R/617/6743	System Administration	5	20
Y/617/6744	Network Routing and Switching	5	20
D/617/6745	Network Design and Administration	5	20

Assessment Grades

Marks Ranges %	**Assessment Criteria**
Fail (0-39)	Insufficient information about each assessment criteria
Pass (40-59)	Describe main ideas with evidence on each assessment criteria
Merit (60-69)	Evaluation of ideas with evidence on each assessment criteria
Distinction (70-100)	Critical evaluation of ideas with evidence on each assessment criteria
No Marks	Plagiarism

UNIT SPECIFICATIONS

Unit Title
Information Technology and IT Ethics

Level
4

Learning Time Hours
200

Credit Value
20

Unit aim
This unit aims to develop learners' knowledge and use of information technology, including the use of standard office applications to prepare documents and presentations. This includes computer software and hardware, basic computer operations, application software, operating systems, information systems and IT-related issues in computing. The unit also seeks to provide learners with an awareness of ethical issues essential to an IT professional. This includes ethics in the cyberspace, intellectual property, privacy, the issue of security and reliability, how computing affects our health, professional code of ethics and how IT changes our daily lives.

Learning outcomes and assessment criteria
In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

Learning Outcome	Assessment Criteria
1. Understand the applications of information technology	1.1 Analyse the uses, strengths and limitations of different categories of hardware and software 1.2. Analyse the applications of artificial intelligence (AI) 1.3. Produce a specification of requirements for an application that meets the brief 1.4. Create and present presentations that demonstrate an application layout using planning tools
2. Understand the ethics involved in information technology	2.1 Analyse the nature of information technology ethics and its application to IT 2.2 Analyse the analogy that relates ethics, morality and society 2.3 Assess how and why information technology gives rise to ethical dilemmas not present in other technologies 2.4 Evaluate the issues relating to IT ethics, justifying their conclusions

Suggested Resources
- Shelly, Cashman and Vermaat (2016) Discovering Computers 2016 – A Gateway to Information, Thomson Course Technology.
- Quinn MJ (2016) Ethics for the Information Age, 7th edition, Pearson Education.
- Breaux T (2015) Introduction to IT Privacy: A Handbook for Technologists, IAPP Publication.

UNIT SPECIFICATIONS

Unit Title
Mathematics and Statistics for IT

Level
4

Learning Time Hours
200

Credit Value
20

Unit aim
This unit aims to provide an opportunity to learn mathematics and statistics and equip learners with the mathematical skills to analyse and solve problems that will enable them to work within the field of IT. The unit covers number systems, logic, relations, functions, quadratic equations, quadratic functions, simultaneous equations, polynomial equations, exponential functions, logarithmic functions, coordinate geometry and matrices. The unit provides an opportunity to learn statistics and equip learners with the descriptive and analytical methods for dealing with variability in observed data. It covers the graphical presentation of data, descriptive statistics, index numbers, correlation and regression, time series, probability and statistical inference.

Learning outcomes and assessment criteria
In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

Learning Outcome	Assessment Criteria
1. Understand the mathematics	1.1 Explain the nature of the roots of quadratic equations, the rules of exponents

underpinning information technology	and logarithms and a function 1.2 Explain the relationship between a domain, range and function 1.3 Rewrite an exponential equation in logarithmic form and a logarithmic equation in exponential form 1.4 Compute maximum and minimum values of quadratic functions, composite functions, inverse functions, the area of a polygon, the equation of a straight line, locus, measures of central tendency and measures of dispersion and probability 1.5 Analyse the impact of quadratic inequalities, polynomial equations, exponential equations, logarithmic equations and simultaneous equations on hardware design
2. Understand the statistics underpinning information technology	2.1 Calculate summary measures correctly 2.2 Define and interpret probability models 2.3 Evaluate methods of estimation and hypothesis testing 2.4 Analyse the concepts of statistical methodologies

Suggested Resources

- Lan Foo Huat, Yong Kien Cheng (2017) Essential SPM Additional Mathematics, Sasbadi
- Wong Pek Wei, Dr. Wong Sin Mong (2016) Success Additional Mathematics SPM, Oxford Fajar
- J.S. Ratti, Marcus S. McWaters (2015) College Algebra and Trigonometry, 3rd Edition, Addison Wesley
- Judith A. Beecher, Judith A. Penna, Marvin L. Bittinger, (2016) Algebra and Trigonometry, 5th Edition, Addison Wesley
- Allan G. Bluman (2015) Elementary Statistics A Step by Step Approach, 9th Edition, McGraw Hill
- Prem S. Mann (2017) Introductory Statistics, 9th Edition, John Wiley & Sons
- Allan G. Bluman (2017) Elementary Statistics A Step by Step Approach, 10th Edition, McGraw Hill

UNIT SPECIFICATIONS

Unit Title
PC Maintenance and Operating Systems

Level
4

Learning Time Hours
200

Credit Value
20

Unit aim
This unit aims to provide knowledge of personal computer hardware. Successful completion of this unit will enable learners to install a computer system unit and operating system and conduct troubleshooting. The unit provides the essential knowledge of computer hardware, the software needed to make a hardware work, the components of the hardware and the technologies and principles that support the components. In addition to this knowledge, learners will be able to assemble computer hardware to build a full set PC, understand how to install the operating system and how to conduct troubleshooting in faulty hardware. This unit also aims to provide the basic concepts about operating systems and to be able to install, configure and operate two commonly used operating systems. It includes an overview of Windows and Linux operating systems, the installation and configuration of these systems; the use of proper file systems; managing groups and users; installing and uninstalling applications on these two operating systems; operating basic command-line environment; manipulating simple files and printer-sharing.

Learning outcomes and assessment criteria
In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

Learning Outcome	Assessment Criteria
1. Understand a range of operating systems	1.1 Analyse the functionalities of PC hardware 1.2. Install and commission a working personal computer to the required standard 1.3. Optimize the operating system environment to the required standard 1.4. Conduct troubleshooting to identify and solve common PC problems
2. Understand Windows and Linux operating systems	2.1 Analyse the usage and the role of an operating system 2.2 Establish a disc operating environment that is appropriate to the required functionality 2.3 Configure the Windows and Linux operating systems to the required standard

	2.4 Use common utilities and programs in the Windows and Linux operating systems correctly to configure file systems and to manage users and groups

Suggested Resources

- Wilson K (2018), Computer Hardware: The Illustrated Guide to Understanding Computer Hardware (Computer Fundamentals), Illuminated Press
- Tanenbaum AS (2016), Modern Operating Systems, Pearson, India
- Mueller S (2015) Upgrading and repairing PCs, 22nd Edition, Pearson India

UNIT SPECIFICATIONS

Unit Title
Computer Graphics Editing and Database Concepts

Level
4

Learning Time Hours
200

Credit Value
20

Unit aim
This unit aims to explain the concepts of photo editing. This will enable learners to insert photos into documents such as user manuals and the IT structure of an organization. The photos may need to be touched up before they are ready for use. This mainly involves using Adobe Photoshop and Adobe Illustrator for photo/image editing and designing. The unit delivers skills in photo retouching and digital drawing to address the issues of digital image design. It emphasizes exploration, techniques, media, ideas development and production techniques. This unit also provides the fundamental concepts of a database system through Database Management System (DBMS), relational databases, entity relationship modelling and normalization. Learners are also required to create database systems using the database language of Structured Query Language (SQL).

Learning outcomes and assessment criteria
In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

Learning Outcome	Assessment Criteria
1. Use computer graphic editing techniques to edit photos and create illustrations	1.1 Apply photo editing, retouching and repairing techniques correctly 1.2. Use Photoshop correctly to create the required effects 1.3. Create illustrations using illustration software tools to the required standard 1.4. Analyse techniques to create movement in a graphical environment
2. Create a database system	2.1 Define the concept of a relational database 2.2 Build an entity-relationship diagram, deriving relations and validating relations using normalization 2.3 Create a database using Data Definition Language (DDL) and manipulate a database using Data Manipulation Language (DML) that meets the specification

Suggested Resources

- Adobe Team (2016), Adobe Photoshop CC Classroom in a book, Adobe Press.
- Adobe Team (2017), Adobe Illustrator CC Classroom in a book, Adobe Press.
- Thomas M. Connolly and Carolyn E. Begg (2015) Database Systems: A Practical Approach
- Design, Implementation and Management, Edition: 6, Addison-Wesley.

UNIT SPECIFICATIONS

Unit Title
Logical IT Networking

Level
4

Learning Time Hours
200

Credit Value
20

Unit aim
This unit aims to provide learners with knowledge of logical networking. It covers Transmission Control Protocol (TCP) / Internet Protocol (IP), Local Area Networks (LAN) and Wide Area Networking (WAN), including IP address and subnetting.

Learning outcomes and assessment criteria
In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

Learning Outcome	Assessment Criteria
1. Understand logical networking	1.1 Analyse the nature and features of a logical network 1.2. Analyse the differences between network architectures 1.3. Analyse the functionality of each layer in an OSI network model 1.4. Define correctly an IP address and subnet masks
2. Understand the components and interfaces between different logical networking attributes	2.1 Analyse the rules of network protocols and communications 2.2. Analyse the differences within the physical layer 2.3. Analyse the requirements of WAN and LAN topologies and a data link protocol 2.4. Analyse the differences within the network layer and transport layer 2.5. Establish network design considerations
3. Understand the security requirements of a logical network	3.1 Analyse the security requirements of a network 3.2. Identify the threats to a network 3.3. Develop security protocols for a logical network that respond to the threats identified

Suggested Resources
- Lowe D (2018), Networking All-in-One for Dummies 7th Edition, John Wiley & Sons, New Jersey
- Cisco e-Learning portal (http://cisco.netacad.net).
- Petzold C (2000), The Hidden Language of Computer Hardware, Microsoft Press, Washington

UNIT SPECIFICATIONS

Unit Title
Physical IT Networking

Level
4

Learning Time Hours
200

Credit Value
20

Unit aim
This unit aims to provide learners with knowledge of physical networking and basic network administration skills. It covers knowledge of computer networks.

Learning outcomes and assessment criteria
In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

Learning Outcome	Assessment Criteria
1. Apply the components of physical networking.	1.1 Analyse the nature and requirements of a physical network 1.2. Analyse the requirements of different networking standards 1.3. Set up and configure LAN network devices to the required configuration
2. Understand the components and interfaces between different physical	2.1 Analyse the requirements for the ongoing maintenance of a physical network operating system

networking attributes.	2.2. Assess the implications of different connectivity considerations 2.3. Analyse the purpose and implications of different protocols of the application layer
3. Install security protocols in a physical network.	3.1. Install and configure a firewall to the required standard 3.2. Document actions taken in response to threats to security to the required standard 3.3. Determine the source and nature of threats to a network 3.4. Take action to mitigate identified risks that is appropriate to the nature and scale of the risk

Suggested Resources

- Lowe D (2018), Networking All-in-One for Dummies 7th Edition, John Wiley & Sons, New Jersey
- Cisco e-Learning portal (http://cisco.netacad.net).
- McNab C (2016) Network Security Assessment: Know Your Network, 3rd Edition, O'Reilly

UNIT SPECIFICATIONS

Unit Title
Technopreneurship

Level
5

Learning Time Hours
200

Credit Value
20

Unit aim
This unit aims to provide learners with the knowledge and skills needed to establish a new techno business. It includes understanding the characteristics of entrepreneurs, planning, marketing and finance.

Learning outcomes and assessment criteria
In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

Learning Outcome	Assessment Criteria
1. Assess the nature of technological entrepreneurship	1.1 Evaluate the characteristics of techno entrepreneurs and the techno entrepreneurial process 1.2 Evaluate trends and opportunities within technological entrepreneurship 1.3 Analyse the features and application of the five pillars of technological entrepreneurship
2. Establish a new techno business	2.1 Evaluate the potential for new products or services and new potential markets for them 2.2 Take action to protect intellectual property that is appropriate to the nature of the business 2.3 Structure the business in a way that optimizes assets, investment and ownership 2.4 Prepare a business and marketing for a new techno business that sets SMART objectives and optimizes available resources 2.5 Market the business in accordance with the marketing plan

Suggested Resources

- Duening TN, Hisrich RA, Lechter MA (2014) Technology Entrepreneurship: Taking Innovation to the Marketplace, 2nd Edition, Academic Press
- Therin F (editor) (2014) Handbook of Research on Techno-Entrepreneurship: How Technology and Entrepreneurship are Shaping the Development of Industries and Companies (Research Handbooks in Business and Management Series), 2nd Edition, Edward Elgar Publishing, Glos, UK
- Nassar J (2018) Technopreneurship Financing and Startups Ecosystem: How Malaysia is Creating Another Success Story

UNIT SPECIFICATIONS

Unit Title
Network Security

Level
5

Learning Time Hours
200

Credit Value
20

Unit aim
This unit aims to provide learners with knowledge of network security issues in a networked environment and the process of preventing and detection common security incidents. The unit covers authentication; attacks and malicious codes; the security of remote access; email and web security; the security of directory and file transfer services; storage media; network security; intrusion detection; physical and security and disaster recovery.

Learning outcomes and assessment criteria
In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

Learning Outcome	Assessment Criteria
1. Understand computer network security	1.1 Analyse the factors that affect network and computer security. 1.2 Identify common security issues in a networked environment 1.3 Analyse the role that artificial intelligence (AI) could have in defending networks
2. Understand methods of maintaining computer security	2.1 Analyse the strengths and weaknesses of different methods of authentication 2.2 Analyse the nature of different types of attack and malicious codes 2.3 Select the security tool that is appropriate to the nature of the security issue 2.4 Evaluate practices that prevent common attacks from intruders (networks, remote access, email, web security, wireless and instant messaging) 2.5 Analyse the differences between network and host intrusion detection systems

Suggested Resources
- McNab C (2016) Network Security Assessment: Know Your Network, 3rd edition O'Reilly Media Inc.
- Stallings W (2011) Network Security Essentials: Application and Standard, 4th edition, Prentice Hall
- Forshaw J (2017) Attacking Network Protocols, William Pollock, USA

UNIT SPECIFICATIONS

Unit Title
C#.NET Programming

Level
5

Learning Time Hours
200

Credit Value
20

Unit aim
This unit aims to provide learners with the basic concepts and principles of ASP.NET programming using C#. This will enable learners to understand how to create dynamic web pages using server side programming techniques. The unit covers component-based programming and how to access records in relational databases. Successful achievement of this unit will enable learners to create their own web applications and make them available on the internet.

Learning outcomes and assessment criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

Learning Outcome	Assessment Criteria
1. Understand the use of ASP.NET	1.1 Analyse the components / structure of ASP.NET 1.2 Evaluate the advantages and disadvantages of using ASP.NET compared with other web development models 1.3 Analyse the advantages of using validators
2. Design web applications using ASP.NET and ADO.NET	2.1 Use styles, themes and master pages to create an attractive and easily navigable web applications 2.2 Display dynamic data from a relational database by using ADO.NET and data binding through different languages including C# 2.3 Create a web page that uses client side navigation, client side browser redirect, cross page posting and server side transfer that meets the brief

Suggested Resources

- Nagel C (2018): Professional C# 7 and .NET Core 2.0, Wrox
- Price MJ (2017) C# 7.1 and .NET Core 2.0 – Modern Cross-Platform Development, 3rd Edition, Packt Publishing
- Fagerberg J (2016) ASP.NET MVC 5 – Building a Website with Visual Studio 2015 and C Sharp: The Tactical Guidebook, csharpschool.com

UNIT SPECIFICATIONS

Unit Title
System Administration

Level
5

Learning Time Hours
200

Credit Value
20

Unit aim
This unit aims to provide the knowledge needed to administer a system in Linux and Windows. Topics covered include user and group management; file system management; task automation; shell scripting; Dynamic Host Configuration Protocol (DHCP) servers; mail servers; domain name servers; files and printers sharing; basic utilities and tools; application management; registry; local and group policies; backup policies; restore policies and performance tuning.

Learning outcomes and assessment criteria
In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

Learning Outcome	Assessment Criteria
1. Understand system administration	1.1 Analyse the role of the system administrator 1.2 Analyse the elements within system administration 1.3 Analyse the history of the active directory and Lightweight Directory Access Protocol (LDAP) 1.4 Analyse the difference between snapshots and backups 1.5 Analyse the differences between local and group policies on Windows and Linux 1.6 Analyse the role and requirements of backup and restore policies 1.7 Analyse the requirements of managing applications
2. Perform user management and file system management	2.1 Write shell scripts that enable administration tasks to be performed on Linux and Windows systems: Get Help; Check Services; List Users and ping a list of servers 2.2 Set up and configure users and groups to the agreed standard 2.3 Install and configure file and printer sharing to agreed standards 2.4 Write shell scripts to perform snapshots on Linux and Windows servers to agreed standards 2.5 Tune performance through the application of a range of utilities and tools to agreed standards

Suggested Resources

- Nemeth E, Snyder G, Hein TR, Whaley B, Mackin D (2017): UNIX and Linux System Administration Handbook (5th edition), Addison-Wesley Professional
- Frisch A (2002) Essential System Administration: Tools and Techniques for Linux and Unix Administration, 3rd Edition, O'Reilly Media, Sebastopol, CA, USA
- Nickel J (2019) Mastering Identity and Access Management with Microsoft Azure: Empower users by managing and protecting identities and data, 2nd Edition, Packt Publishing

UNIT SPECIFICATIONS

Unit Title
Network Routing and Switching

Level
5

Learning Time Hours
200

Credit Value
20

Unit aim
This unit aims to deliver the knowledge needed to carry out switching and the knowledge and skills needed to carry out routing – how to set up and configure a router and switches to interconnect a multi area network. The unit covers computer networks routing and switching including Router Information Protocol (RIP); Enhanced Interior Gateway Routing Protocol (EIGRP) and Open Shortest Path First (OSPF).

Learning outcomes and assessment criteria
In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

Learning Outcome	Assessment Criteria
1. Understand switching	1.1 Evaluate the considerations to be taken into account in the purchase of a switch 1.2 Analyse switching techniques and protocols 1.3 Analyse the features in managed switches 1.4 Analyse the differences between circuit switching and packet switching
2. Perform routing	2.1 Evaluate the considerations to be taken into account in making static and inter VLAN routing decisions 2.2 Analyse routing techniques and protocols 2.3 Evaluate the considerations to be taken into account in dynamic routing 2.4 Evaluate the considerations to be taken into account in a single and multi area OSPF 2.5 Set up and configure a single area OSPF to agreed standards 2.6 Configure a multi area OSPF to agreed standards 2.7 Configure a multi area EIGRP to agreed standards

Suggested Resources

- Diaz L (2018): CCNA Routing and Switching 200-125 Certification Guide, Packt Publishing
- Cisco Networking Academy (2016) Routing and Switching Essentials v6 Companion Guide, Cisco Press, Indianapolis, USA
- Emspon S (2016) CCNA Routing and Switching Portable Command Guide (ICND1 100-105, ICND2 200-105 and CCNA 200-125)

UNIT SPECIFICATIONS

Unit Title
Network Design and Administration

Level
5

Learning Time Hours
200

Credit Value
20

Unit aim
This unit aims to provide the knowledge and skills needed to enable learners to design a network i.e. how to scale and connect different networks to form an effective inter-connecting network. It covers hierarchical network design; gathering network requirements; identifying network performance issues.

Learning outcomes and assessment criteria
In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria determine the standard required to achieve the unit.

Learning Outcome	Assessment Criteria
1. Understand network design	1.1 Analyse the requirements of users 1.2 Analyse the different layers in hierarchical network design 1.3 Analyse competing protocols in link aggregation
2. Configure a local area network and a VLAN	2.1 Set up and configure a VLAN to agreed standards 2.2 Analyse the requirements of connectivity and scaling 2.3 Analyse the types and methods used in Network Address Translation (NAT) 2.4 Configure remote connections on Linux and Windows systems to agreed standards
3. Administer a network	3.1 Diagnose and resolve faults in the system 3.2 Configure a network backbone using link aggregation that demonstrates a speed increase 3.3 Analyse the history of the spanning tree protocol and its role in network redundancy 3.4 Analyse the role of a network administrator 3.5 Evaluate the technologies and applications available for network administration

Suggested Resources

- Thomatis M (2017): Network Design Cookbook: 2nd edition, lulu.com
- Dauti B (2017) Windows Server 2016 Administration Fundamentals: Deploy, set up and deliver network services with Windows Server while preparing for the MTA 98-365 exam and pass it with ease, Packt Publishing
- Piper B (2017) Learn Cisco Network Administration in a Month of Lunches, Manning Publications

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