WESTFIELD ACADEMY

Transition booklet

Year 11 to Year 12

Pearson BTEC Level 3 National *Diploma* in Information Technology

This booklet will give you a head start when entering year 12. It will go through all units that you will be completing in the 2 years at Westfield Academy.

Table of Contents

Unit 1 Information Technology Systems - Level: 3 Unit type: External Guided learning hours: 120

Unit in brief Learners study the role of computer systems and the implications of their use in personal and professional situations.

Unit introduction

Information technology (IT) systems have a significant role in the world around us and play a part in almost everything we do. Having a sound understanding of how to effectively select and use appropriate IT systems will benefit you personally and professionally. You will explore the relationships between the hardware and software that form an IT system, and the way that systems work individually and together, as well as the relationship between the user and the system. You will examine issues related to the use of IT systems and the impact that they have on organisations and individuals. To complete the assessment task within this unit, you will need to draw on your learning from across your programme. This unit will give you a fundamental and synoptic understanding of all areas of IT, supporting your progression to an IT-related higher education course.

Summary of assessment

This unit is externally assessed through a written examination set and marked by Pearson. The examination is two hours in length. Learners will be assessed on their understanding of computer systems and the implications of their use in personal and professional situations. The number of marks for the unit is 90.

Workbook Unit 1

Question 1 - A Digital device in IT systems- A1 Digital devices, their functions and use

What are the Digital devices that form part or all of IT systems today? Please explain 6 and evaluate the function and the use of the digital device

Question 2 - A2 Peripheral devices and media

What are the features and uses of peripheral devices and media in IT systems to meet the needs of individuals and organisations? Please discuss input devices output devices o storage devices.

Question 3 - A3 Computer software in an IT system

What are the concepts and implications of the use of, and relationships between, hardware and software that form large- and small-scale IT systems and their impact on individuals and organisations? Please identify the types of operating systems such as single user, real time operating system as well as multi user.

Question 4 – operating systems

Discuss the role of the operating systems in managing the following: networking, security, memory management, multi-tasking as well as device drivers.

Question 5 – Interfaces

What are the factors affecting the choice of user interface, please discuss and evaluate the following, graphical, command line, menu based as well as adapted.?

Question 6 – Utility software

What is the purpose, the features and the uses of utility software, how do we make the decision when choosing the utility software?

Question 7 Open source and proprietary operating systems

What are principles and implications of open source and proprietary operating systems and software.

Question 8- interfaces

What is the impact and features of user interfaces in computer software?

Question 9 – file types

What are the features of common file types and formats used for (please describe images, videos as well as application software and evaluate the implications on IT systems for both individuals as well as organisations when selecting the file types as well as formats?

Question 10 Emerging technologies - How emerging technologies can be used by individuals and - organisations

- What are the concepts and implications of how emerging technologies affect the performance of IT systems?

Question 1 - Transmitting data -

What is connectivity: Transmitting data - The concepts, process and implications of transferring data within and between IT systems.

You will need to discuss the following

- Wireless and wired methods of connecting devices and transmitting data within and between IT systems.
- How the features of connection types can meet the needs of individuals and organisations.
- The implications of selecting and using different connection types.
- The impact of connection types on the performance of an IT system

Question 2 Networks - The concepts and implications for individuals and organisations of connecting devices to form a network.

You will need to define the following and explain the features as well as purpose. You will need to also describe the factors affecting the choice such as user needs, connectivity as well as cost and compatibility.

- personal area network (PAN)
- local area network (LAN)
- wide area network (WAN)
- virtual private network (VPN)

Question 3 Issues relating to transmission of data- How the features and processes of data transmission affect the use and performance of IT systems

You will need to then discuss the applications used to compress as well the implications of compression.

Question 4 Operating online - The implications for individuals and organisations of using online IT systems.

You will need to describe and discuss, cloud storage, cloud computing – you will then need to evaluate the personal and professional uses and applications as well as the implications it has on supporting remote working.

Question 5 Online communities - The features of online communities and the implications of their widespread use for organisations and individuals.

You will need to discuss in detail the ways in which communicating has evolved and ensure that you refer to social media, blogs wiki, chatrooms as well as podcasts and instant messaging. This will then lead you to discuss the implications for the user such as privacy, security as well as meeting needs and user experience.

Question 1 Protecting data and information - The issues and implications of storing and transmitting information in digital form.

This section is all about how data can be manipulated and used maliciously.

You will need to look at the following and be able to define, describe and use in different contexts

- The different types of viruses and malware
- What is hacking
- What is phishing and accidental damage

You will then need to discuss the impact this has on individuals as well as organisations.

Question 2- Protecting data

What are the processes used to protect data and systems?

You will need to discuss file permissions, access levels as well how data in backed up. This will then lead you to discuss how passwords are kept strong, what physical access can you implement and what protocols are used in organisations.

You can use the following to help when discussing data (The features, characteristics and implications of using antivirus software to protect data.

- The features, characteristics and implications of using firewalls to protect data.
- The features, applications and implications of encryption methods used to protect: o stored data o data during transmission.
- The role of current legislation in protecting data and IT systems from attack and misuse.

Question 3 - The uses, issues and implications of IT systems and their impact on individuals and organisations.

Here you will be completing a small project on the features of online services are used to meet the needs of individuals and organisations. The project will need to look at the features and implications of using online services to support retail, financial services, education and training, news and information, entertainment and leisure as well as productivity and booking systems.

Question 4 Using and manipulating data

Here you will be exploring the ways in which data is processed and used by organisations. You will be exploring both primary and secondary and looking at how data is reliable or not.

You will be exploring the way in which data is collected via questionnaires, focus groups as well as interviews.

Lastly you will be looking at how we ensure that data is accurate and valid, this will be by validation and verification.

Question 5 – data presentation

You will need to report on how data is extracted and how data can then be presented (please feel free to use COVID `19 news as an example of data and interpreting data.

Question 1 – Issues- The last section on this unit will be looking at the moral and ethical issues affecting information technology.

You will need to create a story map or a booklet containing the following information

- The moral and ethical factors of

- Privacy
- Environmental impact
- The inequality when accessing information
- How online behaviours affects the way data is presented.
- How freedom of speech is affected

Question 2 Legal issue

You will need to define the following:

The role of current legislation (and subsequent additions and amendments) in protecting users and their data from attack and misuse:
o Computer Misuse Act 1990
o Police and Justice Act 2006 (Computer Misuse)
o Copyright, Designs and Patents Act 1988
o The Copyright (Computer Programs) Regulations 1992
o The Health and Safety (Display Screen Equipment) Regulations 1992
o Data protection legislation
o Consumer Rights Act 2015.
• Guidelines and current legislation (and subsequent additions and amendments) designed to ensure the accessibility of IT systems:
o Disability Discrimination Acts 1995 and 2005
o copyright
o computer misuse
o protection of data
o privacy
o accessibility.

Unit 2 Creating Systems to Manage Information

Database key terms

1. Use the suggested resources to define the following terms which are used in databases
   - Database
   - Table
   - Field
   - Record
   - Data type
   - Validation
   - Verification
   - Flat file database
   - Relational database
   - Primary key
   - Query
   - Form

2. Explain who might use a database and what for

3. Analyse the benefits and limitations of using a database rather than paper records

Present this as a word-processed document with images if you think this will help.

Unit 3 Using Social Media in Business

Unit in brief Learners explore how businesses use social media to promote their products and services. Learners also implement social media activities in a business to meet requirements.

Unit introduction Social media websites are a popular way for people to communicate and share information with friends and family. People spend a lot of time on social media websites and they give businesses opportunities to interact with people, for example to promote their business, to encourage people to visit their e-commerce site and buy, to provide customer service. You may be familiar with social media for personal use and in this unit, you will discover how it can be used in a business context. You will explore different social media websites, the ways in which they can be used and the potential pitfalls when using them for business purposes. You will develop a plan to use social media strategies for business purposes to achieve specific aims and objectives. You will then implement the plan, developing and posting content and interacting with others. Finally, you will collect data on the business use of social media and review the effectiveness of your efforts. Understanding how to use social media for business purposes is useful for employment in information technology and in a variety of business sectors. Also, social media skills are closely linked with web and mobile applications development. This unit gives you a starting point for progression to roles such as social media specialist, content developer and web developer

This unit is all about how social media is used in Business and the way in which it is used to promote products and services.

As c/w must be completed in school conditions, our aim here is to read and collect as much information on social media using a range of resources.

Your task will be to focus on the following:

1- Look at three social media websites and give me a history of each. (how it has evolved over the last ten years)
2- Describe the way in which social media website are used to support businesses aims and needs – you will need to look into three businesses and evaluate three examples of how social media was used to help promote their business aims.
3- How do the three businesses use social media to attract you as a customer.
4- What are the risks and issues that come with social media? You must look into news articles as well as social media magazines and evaluate how social media can damage a company. Please look into real life examples in recent years.

5- Create a social media account for a business that you would like to start. After this you will need to talk about the way in which you would promote your product or service and the risks involved and how you will monitor your success.

Unit 4 Programming

Unit 4 Outline

Unit Brief.

You will study the underpinning concepts and implications of programming languages to design, develop and test computer programs.

Unit Introduction.

Organisations and individuals increasingly depend on the functions and services offered by computing devices such as smartphones, tablets, laptops and personal desktop computers. You make use of computing programs when using an operating system or application programs such as word processing and spreadsheets. Understanding the concepts of high-quality software application design and development is key to ensuring that products are effective. As a programmer, you will need to understand the characteristics of different programming languages in order to select and apply appropriate methodologies to meet a client's needs. Many organisations and businesses rely on computer programs to help deliver products and services. Organisations and businesses (often known as 'clients') work closely with programmers to help design and build computer programs that fulfil their requirements. To complete the assessment task within this unit, you will need to draw on your learning from across your programme. of study and apply programming skills to provide a solution for a new IT-related problem. You will learn about computational thinking skills and the principles of designing and developing computer programs. You will apply computational thinking skills to design, develop, test, refine and review computer programs for a given range of purposes. By developing your analytical, problem-solving and programming skills, this unit will help you to progress to higher education or to employment as a software developer.

Throughout the course you will need to use and improve upon a range of IT skills, including

- **Internet research** – being discerning and selective
- **Word processing** – the coursework will need to be presented, often as a business report
- **Presentation using PowerPoint** – some coursework tasks, require a presentation
- **Email** – using this in a professional manner to liaise with staff and clients

- **Python Programming** – to analyse how instructions are structured and develop programming code to solve a roblem.

- **Referencing sources** – this must be done using the Harvard referencing system. Information on how to do this can be found here https://www.ukessays.com/referencing/harvard/

Recommended Resources

https://www.bbc.co.uk/bitesize/levels/z98jmp3 - Whilst aimed at GCSE, this will also provide useful information on many areas, especially if you did not do GCSE Computing. You can use the information in the ICT, Computing and Digital Technology areas

https://www.bbc.co.uk/news/technology - this area of the BBC news website will provide you with up-to-date information on technology development

www.teach-ict.com – a website totally devoted to IT and Computing. The username is and the password is

https://www.knowitallninja.com/ - a website dedicated to L3 BTEC. Especially useful for Unit 1

https://www.thinkuknow.co.uk/ - website for all that is IT

Pearson Textbook – provided by the school

In this unit you will:

A Examine the computational thinking skills and principles of computer programming

B Design a software solution to meet client requirements

C Develop a software solution to meet client requirements.

Preparatory Activities

Week	Date	Activities
Learning aim A: Examine the computational thinking skills and principles of computer programming		
1	11 - 15 May	**A1 Computational thinking skills** Application of computational thinking skills involved in analysing problems and processes, in order to identify solutions that can be developed into software applications. **Decomposition:** Identifying and describing problems and processes Breaking down problems and processes into distinct steps Describing problems and processes as a set of structured steps Communicating the key features of problems and processes to others as relevant. **Task:** What does computational Thinking mean? (Research a definition). Why is it important to analyse a Problem before you try and solve it? Explain how you would look at a situation and identify a solution. How could you produce a software application (Python) to solve a problem? (do this in terms of steps) **Task:** Give an example of where decomposition could be used using the description of what decomposition is.
2	11-15 May	**Pattern recognition:** Identifying common elements or features in problems or systems Identifying and interpreting common differences between processes or problems Identifying individual elements within problems Describing patterns that have been identified Making predictions based on identified patterns. **Task:** In terms of problem solving. What does in mean by common elements / features?

		What is the difference between processes and problems? Think of a simple problem that might a solution. E.G: how to pack for a holiday. Identify the various elements that make up this process. Are there any patterns that you see when trying to sort this problem out? What prediction would you make on how the problem will be solved and what needs to be completed to get there? Write your results in a word document.
3	18-22 May	**Pattern generalisation and abstraction:** Identifying information required to solve an identified problem. Filtering out information required to solve an identified problem. **Representing parts of a problem or system in general terms by identifying**: Variables Constants Key processes Repeated processes Inputs Outputs. **Task:** What have you discovered while trying to work out how to pack for a holiday? What would you consider is a Variable (Something that will change depending on circumstances). What would you consider is a constant (Something that does not change)? What would you consider are the main processes to complete this task? What did you have to repeat a few or several times? What is an Input and Output and where did you use these in the task? (Please don't put: Putting my clothes in and taking them out again)

4	25-29 May	**A2 Uses of software applications** The uses and implications of software applications in solving problems and fulfilling needs, including: • gaming and entertainment • productivity • information storage and management • repetitive tasks or dangerous tasks • social media • search engines. So having looked at solving a problem (Packing for a holiday) and making a detailed note of what needed to be done. How it was to be completed. Breaking big tasks into smaller easy to manage tasks. Looking at patterns that repeated you are ready to explain a programming language. Have a look at the enclosed website and try and see what Python does and how it can be used to solve problems by creating a program to solve it. https://www.python.org/about/gettingstarted/ Look at how programs are structured. Look at commands used. Write about at least 5 commands used in python and how they work together to solve a problem. List the commands you have looked at and their explanations in to your evidence. Also find a simple python program and explain what it does and the commands used. Present your answers as two word-processed files
5	1-5 June	**Computer Systems** This task is all about understanding what is meant by a computer system and how Data is processed The following sources will be useful: LINK 1 LINK 2 VIDEOS 1. Make a collage or mind map of examples of computer systems including Inputs and Outputs. 2. Look at how data is processed by a Computer 3. Describe what is meant by the Fetch-decode- execute cycle. 4. What is a processor and how does a programmer make it work? Present the work as a word-processed report

6	8-12 June	**A3 Features and characteristics of programming languages** • The uses and applications of different types of high and low-level programming languages, developed to assist in the solution of particular problems, such as: Procedural, e.g. C, Perl®, PythonTM Object-orientated, e.g. C++, C#®, Java® Event-driven, e.g. Visual Basic® Machine, e.g. Assembler o mark-up, e.g. HTML. **Task:** Explore each of these types of programming procedures. Explain what each one does and give an example. What software would use this type of language? Why are there so many? Why can't there be just one? Show some examples of coding from each of these languages. Put your findings and evidence into a PowerPoint Presentation. **• Factors to compare and contrast in programming languages, including**: Hardware and software needed for running and developing a program Special devices required Performance Preferred application areas Development time Ease of development. **Task:** Having looked at the what the various languages are and where they are used, you need to expand your research to what these program languages need to run. Use the about list as a heading and answer what is required. Word document would be good for this task evidence.

7	15-19 June	**A4 Constructs and techniques and their implementation in different languages** **• Programming languages, constructs and techniques, including:** Command words Constants and variables, local and global variables Data types – character, string, integer, real, Boolean Statements – assignment, input and output, sequence, iteration, selection Logical operations. • Other constructs, such as: Subroutines, functions and procedures String handling, including examining single characters and substrings Arrays – two-dimensional and three-dimensional, splitting and joining File handling – open, read, write, close, database Data structures Event handling. • Documentation of code. **Task:** Following on from the research you have done about Python as a programming language and looking at other languages use the headings above and try and find the answers from your research. What is a Local Variable? What is a Global Variable? The answers can be found on most programming websites or introduction to programming and don't have to be Python based. Present this as one word-processed document.
8	22-26 June	**A5 Principles of logic applied to program design Principles, including:** Iteration – repetition of a computational procedure applied to the result of a previous application Mathematical logic – inference, consistency, completeness, verification by truth tables Propositional dynamic logic to demonstrate the function of algorithms

		Use of sets, e.g. properties and interrelationships of sets of data, search/filter sets of data. **Task:** Using a computer online dictionary. Find a definition and example for each of the above. https://techterms.com/definition/iteration https://en.wikipedia.org/wiki/Truth_table Above are two examples for you to look at. Please complete the rest and present your evidence as a word document
9	29 June-3 July	**A6 Quality of software applications How the design and implementation of a software application affects quality, including:** Efficiency/performance, e.g. the system resources consumed by the program, CPU cycles, processor time, memory space, accessing storage media Maintainability, e.g. ease with which a program can be modified by its present or future developer in order to carry out corrective, perfective or adaptive maintenance Portability, e.g. range of computer hardware, operating systems and platforms on which the source code can be run/compiled/interpreted Reliability, e.g. accuracy and the consistency of its outputs Robustness, e.g. quality of coding and testing to ensure that extreme and erroneous data can be processed without causing the program to crash Usability, e.g. ease with which an end user can use the program. **Task:** So you have looked at various languages. How a computer works. How data is processed and some Python commands. You have by now find out that Python is a Procedural programming language and therefore logical in its approach to being programmed.

		Look at each section above and explain why all the points above must be complimented (They must be in place) for the program to be able to work and work efficiently. Place your evidence into a word document or you could use PowerPoint and put some animation in to show your evidence and findings.
10	6 – 10 July	**Programming task in Python:** So having researched what the command are for programming in python. Pick one of the following and design a program to show the results. **PLEASE** do not just copy one from the Internet. A times table program A temperature conversion program from Celsius to Fahrenheit A currency conversion program A weight conversion program A simple alarm Or one or two others of your choice Show your coding and explain what each part does and how each line of code makes up the program and solves the above problems. Please do at least two programs. Upload your finished programs and explanations.
11	13-17 July	Advance Programming tasks in Python. A number guessing game A word guessing game A random number generator Listing all primary numbers from 1 to 10,000 A program that uses functions and sub routines A hangman game A noughts and crosses game Or one or two others of your choice Please do at least two programs. Upload your finished programs and explanations.

12	20-24 July	**Presentation of Evidence** Having worked through all the research and tasks set in this bridging course, you will now be ready for the Unit 4 in September 2020. In this task booklet we have only covered Learning aim A. Parts B and C will be completed from September. The description of each section is listed below. Please keep looking at examples of Python programming and understand Computational thinking, as well as Decomposition, Abstraction, Pattern Recognition. **We look forward to teaching you in year 12 from September.**

Summary of unit

Learning aim	Key content areas	Recommended assessment approach
A Examine the computational thinking skills and principles of computer programming	**A1** Computational thinking skills **A2** Uses of software applications **A3** Features and characteristics of programming languages **A4** Constructs and techniques and their implementation in different languages **A5** Principles of logic applied to program design **A6** Quality of software applications	A report evaluating computational thinking skills and how the principles of software design and computer programming are applied to create effective, high-quality software applications.
B Design a software solution to meet client requirements	**B1** Software development life cycle **B2** Software solutions design	A project brief identifying the scope of the problem and user/client requirements. Design documentation for the suggested solution. User feedback and design refinement documentation. Development and support documentation, including development and testing logs, meeting notes and a report that evaluates the outcomes and development of the project.
C Develop a software solution to meet client requirements	**C1** Software solutions development **C2** Testing software solutions **C3** Improvement, refinement and optimisation of software applications **C4** Review of software solutions **C5** Skills, knowledge and behaviours	

Unit 5 Data Modelling

Spreadsheet Key terms

1. Use the suggested resources to define the following terms which are used in spreadsheets. Include screenshots if you can to help your definitions
   - Workbook
   - Worksheet
   - Column
   - Row
   - Cell
   - Active cell
   - Formula
   - Function
   - Cell reference
   - Absolute cell reference
   - Conditional formatting

2. Explain who might use spreadsheets and what for
3. Analyse the benefits and limitations of using spreadsheets rather than paper and a calculator
4. Explain how a spreadsheet program can be used to format the data within a spreadsheet to improve the look and make it easier to use

Present this as one word-processed document.

Spreadsheet practical task 1

You will need to use excel for this task (available through your Office 365 login)

Download the file provided and the instruction sheet
Work through the tasks and submit your finished spreadsheet

Spreadsheet practical task 2

You will need to use excel again for this task (available through your Office 365 login)

Download the file provided and the instruction sheet
Work through the tasks and submit your finished spreadsheet

Recommended books and websites

Recommended Resources

https://www.bbc.co.uk/bitesize/levels/z98jmp3 - Whilst aimed at GCSE, this will also provide useful information on many areas, especially if you did not do GCSE Computing. You can use the information in the ICT, Computing and Digital Technology areas

https://www.bbc.co.uk/news/technology - this area of the BBC news website will provide you with up-to-date information on technology development

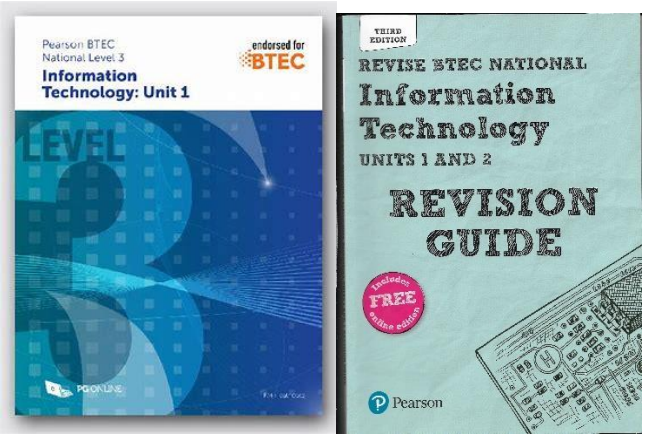
www.teach-ict.com – a website totally devoted to IT and Computing. The username is and the password is

https://www.knowitallninja.com/ - a website dedicated to L3 BTEC. Especially useful for Unit 1

https://www.thinkuknow.co.uk/ - website for e-safety advice

Pearson Textbook – provided by the school

PG Online textbook – excellent for Unit 1 theory



Pearson Revision Guide – invaluable for the externally assessed units