



Level 5 Diploma in PC Engineering & Structured Cabling (108)
133 Credits



Unit: PC Engineering	Guided Learning Hours: 240
Exam Paper No.: 1	Number of Credits: 24
Prerequisites: Knowledge in Windows Operating System.	Corequisites: A pass or better in Certificate in Networking or equivalence.
<p>Aim: Preventative maintenance and diagnosis of PCs will be emphasised along with basic to advanced troubleshooting skills. Software and hardware tools will be used and evaluated in class. Upgrades, configuration/batch files, power, memory, drives, input, modems, communications, printing, and how these topics interact will be examined. This unit provides the learner with a broad overview of PC Engineering, focusing on the essential elements of hardware and software, as well as the importance of safety. It also explains the essential characteristics of a PC Engineer technician and the various types of employment available. It defines and describes the elements and function of hardware devices which are part of a modern Personal Computer system. This unit provides the learner with more sophisticated techniques in PC Engineering, including external I/O devices, printers, notebooks/laptops/PDAs, purchasing and building PCs, troubleshooting, support, virus protection and data protection; including the following computer repair areas: installing, configuring, upgrading, diagnosing, troubleshooting, system boards, processors, and memory, I/O devices, printing, basic networking, security, and customer support and ethics. Also covered are basic operational concepts, identification, installation, and configuration of microprocessors, memory, mother-boards, power supplies, hard disks, video monitors, graphics cards, serial and parallel cards, modems, printers. The unit emphasises on the use of diagnostic software tools and troubleshooting advanced problems. Technical topics on sound cards, CD-ROM, hard drives, SCSI, system teardown and inspection, hardware and software service documentation are covered in detail.</p>	
Required Materials: Computer parts	Supplementary Materials: Lecture notes and tutor extra reading recommendations.
<p>Special Requirements: The course requires a combination of lectures, demonstrations, discussions, and hands-on labs. Hands-on labs will be used to reinforce class work.</p>	
<p>Major Learning Outcomes:</p> <ol style="list-style-type: none"> 1. External connections, BIOS, computer numbering system and the operating system functions. 2. The remove and installation of power supply and PC electrical components. 3. The functions of major parts and the relationship on the PC motherboard components. 	<p>Assessment Criteria:</p> <ol style="list-style-type: none"> 1.1 Examine and identify the PC connections 1.2 Analyse and describe how BIOS works 1.3 Demonstrate how to configure BIOS 1.4 Describe the types and functions of the operating system 1.5 Identify the internal components of a PC 1.6 Demonstrate how work with binary and hexadecimal numbers 1.7 Demonstrate how to de-assemble and re-assemble PC components 2.1 Analyse and identify the PC power supply components 2.2 Examine the different power supply standards and wattage 2.3 Describe power supply problems 2.4 Demonstrate how to calculate electrical measurements 2.5 Demonstrate how to use a multimeter 3.1 Analyse major parts of the motherboard 3.2 Analyse how graphics card works 3.3 Describe how sound cards work 3.4 Define 3D graphics 3.5 Demonstrate how to install/remove a

	<p>computer motherboard</p> <p>3.6 Install a computer motherboard</p> <p>3.7 Describe flash BIOS operations</p>
<p>4. The key CPU architectural innovations include index register, cache, virtual memory, instruction pipelining, superscalar, CISC, RISC and virtual machine.</p>	<p>4.1 Describe the functions of the microprocessor</p> <p>4.2 Describe microprocessor manufacturers</p> <p>4.3 Explain how the microprocessor works</p> <p>4.4 Describe the importance of 64-bit processor</p> <p>4.5 Identify the CPU components</p> <p>4.6 Demonstrate how to remove and install a CPU</p>
<p>5. The PC memory architecture configuration settings; how multi-channel memory architecture increases the transfer speed of data between the DRAM and the memory controller.</p>	<p>5.1 Describe the different types of memory</p> <p>5.2 Describe how computer memory works</p> <p>5.3 Explain how caching works</p> <p>5.4 Describe how flash memory works</p> <p>5.5 Analyse and identify how RAM works</p> <p>5.6 Demonstrate how to configure virtual memory</p> <p>5.7 Examine Read Only Memory (ROM) settings and how it works</p> <p>5.8 Analyse and compare different memory modules</p> <p>5.9 Demonstrate how to remove and install memory</p>
<p>6. Computer wire structures that connect devices divided between data, address and control buses.</p>	<p>6.1 Describe the different system buses</p> <p>6.2 Explain how PCI works</p> <p>6.3 Analyse computer serial ports</p> <p>6.4 Analyse computer parallel ports</p> <p>6.5 Analyse how USB ports works</p> <p>6.6 Describe how firewire works</p> <p>6.7 Identify PC bus architectures</p>
<p>7. Understand data storage devices used for recording (storing) information (data).</p>	<p>7.1 Distinguish the logical layout of hard disk vs tape</p> <p>7.2 Examine hard drive components</p> <p>7.3 Analyse how the hard drive works</p> <p>7.4 Compare and contrast (i) IDE (ii) SCSI (iii) SATA</p> <p>7.5 Describe how IDE works</p> <p>7.6 Describe how SCSI works</p> <p>7.7 Describe how tape recorders work</p> <p>7.8 Describe Redundant Array of Inexpensive Disk (RAID) technology</p> <p>7.9 Examine the hard drive geometry</p> <p>7.10 Demonstrate how to remove and install IDE/SATA hard drive</p> <p>7.11 Describe how to partition and format a hard drive</p> <p>7.12 Demonstrate how to defragment a hard drive</p>
<p>8. Understand the main reasons for using the removable storage media and the different removable storage devices.</p>	<p>8.1 Describe the magnetic disk technology</p> <p>8.2 Explain optical storage technology</p> <p>8.3 Demonstrate how to remove and install internal/external drives</p>
<p>9. The functions of computer input/output devices and the different input and output devices.</p>	<p>8.4 Demonstrate removable storage media</p>

<p>10. Printer hardware; identifying and fixing common printer problems; the installation and printer configuration.</p>	<p>connectivity</p> <p>8.5 Configure storage media BIOS settings</p> <p>9.1 Explain how keyboards work</p> <p>9.2 Describe the advantages and disadvantages of keyboards</p> <p>9.3 Explain how scanners work</p> <p>9.4 Examine the different types of mice</p> <p>9.5 Describe how computer monitors work</p> <p>9.6 Demonstrate connecting input/output devices</p> <p>10.1 Describe the functions of print drivers</p> <p>10.2 Discuss the different types of printers</p> <p>10.3 Describe how inkjet printers work</p> <p>10.4 Describe how laserjet printers work</p> <p>10.5 Analyse printer interfaces</p> <p>10.6 Demonstrate how to install and configure a printer</p> <p>10.7 Setup printer device drivers</p>
<p>Methods of Evaluation: A 2½-hour written examination paper with five essay questions, each carrying 20 marks. Candidates are required to answer all questions. Candidates also undertake project/coursework in PC Engineering with a weighting of 100%.</p>	

Recommended Learning Resources: PC Engineering

<p>Text Books</p>	<ul style="list-style-type: none"> • The Complete PC Upgrade and Maintenance Guide (Complete PC Upgrade & Maintenance Guide) by Mark Minasi, Faithe Wempen and Quentin Docter. ISBN-10: 0782144314 • Upgrading and Repairing PCs (Upgrading and Repairing PCs) by Scott Mueller. ISBN-10: 0789734044 • PC Upgrade and Repair Bible by Press. ISBN-10: 0764530232
<p>Study Manuals</p> 	<p>BCE produced study packs</p>
<p>CD ROM</p> 	<p>Power-point slides</p>
<p>Software</p> 	<p>Windows Operating System</p>