LONDON CAPITAL COMPUTER COLLEGE

Diploma in PC Engineering & Structured Cabling (108) – PC Engineering

Prerequisites: Knowledge of Windows operating system.	**Corequisites:** A Pass or better in Certificate in Networking or equivalence.

Aim: Preventative maintenance and diagnosis of the PC 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 in the network will be examined. This course provides the candidate with a broad view 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 course provides the candidate 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. Test covers 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, floppy and hard disks, video monitors, graphics cards, serial and parallel cards, modems, printers. System teardown and inspection, hardware and software service documentation. The course emphasises the use of diagnostic software tools and troubleshooting advanced problems. Technical topics on sound cards, CD-ROM, hard drives, SCSI, are covered in detail.

Required Materials: Computer parts	**Supplementary Materials:** Lecture notes and tutor extra reading recommendations.

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.

Major Learning Outcomes:	Assessment Criteria:	
1. Describe external connections, BIOS, computer numbering system and the operating system functions.	1.1	Explore the PC connections
	1.2	Analyse how BIOS works
	1.3	Be able to configure BIOS
	1.4	Discuss the types and functions of the operating system
	1.5	Identify the internal components of a PC
	1.6	Work with binary and hexadecimal numbers
	1.7	De-assemble and re-assemble PC components
2. Demonstrate the remove and installation of power supply and PC electrical components.	2.1	Analyse the PC power supply
	2.2	Explore power supply standards and wattage
	2.3	Discuss power supply problems
	2.4	Calculate electrical measurements
	2.5	Be able to use a multimeter
3. Describe the functions of each major parts and the relationship on the PC motherboard components.	3.1	Analyse major parts of the motherboard
	3.2	Analyse how graphics works
	3.3	Explore how sound cards work

	3.4	Discuss 3D graphics
	3.5	Remove a computer motherboard
	3.6	Install a computer motherboard
	3.7	Identify flash BIOS
4. Describe the key CPU architectural innovations include index register, cache, virtual memory, instruction pipelining, superscalar, CISC, RISC and virtual machine.	4.1	Describe the functions of the microprocessor
	4.2	Discuss microprocessor manufacturers
	4.3	Analyse how the microprocessor works
	4.4	Explore the importance of 64-bit processor
	4.5	Identify the CPU
	4.6	Remove and install a CPU
5. Describe the PC Memory architecture configuration settings and analyse how multi-channel memory architecture increases the transfer speed of data between the DRAM and the memory controller.	5.1	Research on the types of memory
	5.2	Describe how computer memory works
	5.3	Explain how caching works
	5.4	Describe how flash memory works
	5.5	Analyse how RAM works
	5.6	Configure virtual memory
	5.7	Explore Read Only Memory (ROM) settings and how it works
	5.8	Compare different memory modules
	5.9	Remove and install memory
6. Analyse computer wire structures that connect devices divided between data, address and control buses.	6.1	Discuss the different system buses
	6.2	Explain how PCI works
	6.3	Analyse computer serial ports
	6.4	Analyse computer parallel ports
	6.5	Analyse how USB ports works
	6.6	Describe how firewire works
	6.7	Identify PC bus architectures
7. Analyse data storage devices used for recording (storing) information (data).	7.1	Distinguish the logical layout of hard disk vs tape
	7.2	Explore hard drive components
	7.3	Analyse how the hard drive works
	7.4	Compare and contrast (i) IDE (ii) SCSI (iii) SATA
	7.5	Describe how IDE works
	7.6	Describe how SCSI works
	7.7	Describe how tape recorders work
	7.8	Explore Redundant Array of Inexpensive Disk (RAID) technology
	7.9	Examine the hard drive geometry
	7.10	Remove and install IDE/SATA hard drive
	7.11	Partition and format a hard drive
	7.12	Defragment a hard drive
8. Outline the main reasons for using the removable storage media and describe the different removable storage devices.	8.1	Discuss magnetic technology
	8.2	Analyse optical storage technology
	8.3	Remove and install CD/DVD drive
9. Outline the functions of computer input/output devices and list the different input and output devices.	9.1	Analyse how keyboards work
	9.2	Describe the advantages and disadvantages of keyboards
	9.3	Analyse how scanners work
	9.4	Explore the different types of mice
	9.5	Explore how computer monitors work

10. Describe printer hardware consideration and demonstrate the installation and printer configuration.	10.1 Describe the functions of print drivers 10.2 Discuss the different types of printers 10.3 Describe how inkjet printers work 10.4 Describe how laserjet printers work 10.5 Analyse printer interfaces 10.6 Install and configure a printer

Recommended Learning Resources:
PC Engineering

Text Books	• 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
Study Manuals	BCE produced study packs
CD ROM	Power-point slides
Software	Windows Operating System