# LONDON CAPITAL COMPUTER COLLEGE

## Diploma in PC Engineering & Structured Cabling (108) – Data Recovery & System Configuration

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

**Data Recovery**

The course focuses on the firmware components of Hard Disk Drive (HDD) and how they operate and interact. Candidates need to understand how PCs read and write data and how to diagnose each component to determine the cause of the failure. Candidates will work through various common scenarios of HDD failures and recovery procedures and develop a strategy to fix the HDD. Each HDD failure and data rescue is unique but an organised plan ensures that the data is recovered. The course will show the exact techniques and procedures to follow. The most challenging aspect of data recovery is vendor specific information. As each manufacturer pushes the envelope to design superior HDD with larger and larger capacities, data recovery professionals need tools and knowledge to quickly solve problems they face to make the drive in front of them to work. Techniques and tools that work on one drive will not work on another HDD from a different manufacturer. Sometimes even different models of the same manufacturer have completely different design architectures.

**System Configuration**

The topics in this section specify, for each existing service pack and feature release, the hardware and software requirements necessary to implement and maintain Windows configuration in any environment. Whether one is working as a network administrator or have an administrator's level of understanding, this course covers System Configuration in depth to be able to optimise and enhance PCs, servers and data! The System Configuration course is designed to help candidates assess, deploy and update servers, workstations and other physical and virtual devices. Once candidates master the different features involved, the potential for efficiency, customisation and protection of PCs, servers and data is seemingly limitless. Users upgrade to new Windows versions every three to five years; this course enable candidates easily upgrade to new systems and give the skills for features like interface, security changes required, peripheral components support. In most cases it is only system resources which remain same, as far as the hardware components are concern then it varies from computer to computer. Candidates gain the essential knowledge in system requirements and system resources which includes hard disk storage, RAM, motherboard slots, data bus, address bus, Processor frequency etc. The importance of hands-on knowledge and experience in system services and utilities running behind the scenes and how to optimise them can not be over emphasised!.

| **Required Materials:** Recommended Learning Resources. | **Supplementary Materials:** Lecture notes and tutor extra reading recommendations. |
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| **Special Requirements:** The course requires a combination of lectures, demonstrations, discussions, and hands-on labs. ||
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| **Major Learning Outcomes:** | **Assessment Criteria:** |
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| **Data Recovery** | **Data Recovery** |
| 1        Demonstrate the process of retrieving lost, deleted, unusable or inaccessible data and how it can be restored. | 1.1      Describe data recovery<br>1.2      Be able to analyse different data recovery symptoms<br>1.3      Describe data recovery principles<br>1.4      Describe software data loss causes<br>1.5      Describe hardware data loss causes |
| 2.       Describe data protection technologies | 2.1      Define different ways of protecting data |

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| and the layout and components of a hard disk. | 2.2 | Describe the technical specifications and parameters of hard disks |
| | 2.3 | Describe the physical structure of a hard disk |
| | 2.4 | Analyse the logical structure of a hard disk |
| | 2.5 | Describe hard disk connection synopsis |
| 3    Understand hard disk data organisation by demonstrating how date is stored on the hard disk and how the drive head can read or write a circular ring, or band (track). | 3.1 | Describe low level formatting |
| | 3.2 | Explain the functions of low-level formatting |
| | 3.3 | Describe high level formatting |
| | 3.4 | Describe hard disk data storage areas |
| 4    Describe how the Master Boot Record then finds the system partition's starting location on the disk, and loads a copy of its Partition Boot Sector into memory. | 4.1 | Describe Master Boot Record (MBR) recovery process |
| | 4.2 | Describe the process of rebuilding the partition table |
| | 4.3 | Describe the File Allocation Table (FAT) recovery process |
| 5    Demonstrate the general overview of the FAT (File Allocation Table) file system on disk format and analyse the FAT16 file system disk. | 5.1 | Describe FAT16 root directory file management |
| | 5.2 | Describe FAT16 sub-directory file management |
| | 5.3 | Describe what happens when files are deleted on a FAT16 partition |
| | 5.4 | Describe FAT16 formatting process |
| | 5.5 | Describe the process of searching files in a FAT16 partition |
| 6    Describe FAT32 file system disk and demonstrate how FAT32 supports smaller cluster sizes and larger volumes than FAT and the advantages in space allocation. | 6.1 | Describe FAT32 root directory file management |
| | 6.2 | Illustrate how the operating system manages FAT32 sub-directory file management |
| | 6.3 | Describe what happens when files are deleted in FAT32 partition |
| | 6.4 | Demonstrate how operating system manages sub-directory deletion process |
| | 6.5 | Describe FAT32 high level formatting |
| 7    Describe NTFS file system management, demonstrate how NTFS provides performance, security, reliability, and advanced features that are not found in any version of FAT, including how NTFS guarantees volume consistency. | 7.1 | Analyse NTFS features |
| | 7.2 | Describe NTFS file system terminology |
| | 7.3 | Describe NTFS data construction |
| | 7.4 | Define NTFS drivers |
| | 7.5 | Describe DOS Boot Record (DBR) NTFS file system |
| | 7.6 | Describe NTFS file system meta data |
| | 7.7 | Describe NTFS file and folder attributes |
| | 7.8 | Describe NTFS index record |
| 8    Describe Redundant Array of Inexpensive Disks (RAID) specifications detailing levels 0, 1, 2, 3, 4 and 5, the implementation and inherent strengths and weaknesses. | 8.1 | Explain RAID background |
| | 8.2 | Describe RAID implementation process |
| | 8.3 | Be able to transform a basic disk into a dynamic disk |
| | 8.4 | Describe dynamic disk terms |
| | 8.5 | Describe dynamic disk characteristics |
| | **System Configuration** | |

| System Configuration | | |
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| **System Configuration**<br>1.  Analyse Windows startup programs, describe why it takes long for the system to boot-up and be able to identify system startup files. | 1.1<br>1.2<br><br>1.3<br><br>1.4 | Explore Windows configuration utilities<br>Be able to use the Windows registry editor<br>Understand Windows filename restrictions and limitations<br>Understand file extensions and associations |
| 2.  Describe the several components, features and various physical components that make up the BIOS of a typical machine. | 2.1<br>2.2<br><br>2.3<br>2.4<br>2.5<br>2.6<br>2.7<br><br>2.8 | Differentiate the file system files<br>Analyse Windows disk management process<br>Configure Windows dual-boot system<br>Explore the boot-ini file<br>Analyse Windows Backup utilities<br>Describe the startup modes<br>Describe Windows system restore and recovery<br>Upgrade different Windows system process |
| 3.  Demonstrate how a PC system utilities application clean the computer's registry, repair its hard drive, generate free space on its hard drive, optimize system processes and recover data. | 3.1<br><br>3.2<br>3.3<br>3.4<br><br>3.5<br>3.6<br>3.7<br><br>3.8<br><br>3.9<br><br>3.10 | Be able to use the Microsoft Management Console (MMC)<br>Analyse the different fonts<br>Be able to remap the keyboard layout<br>Discuss the impact of restricted accounts on programs<br>Review TCP/IP network tools<br>Analyse the different system folders<br>Describe DLL files and their functions<br>Be able to configure control panel and shortcut icons<br>Practice using Windows environment variables<br>Explore the task manager |
| 4.  Demonstrate the process of changing BIOS and Windows settings using the System Configuration Utility to speed up the boot-up process. | 4.1<br><br>4.2<br>4.3<br><br>4.4 | Customise taskbar, start menu and shortcuts<br>Configure Windows Explorer<br>Organise the favourites folder and personal files<br>Practice using script files |
| 5.  Describe the aims of Performance Evaluation and provide a step-by-step approach to developing and implementing a fair and consistent system performance evaluation. | 5.1<br><br>5.2<br>5.3<br><br>5.4 | Analyse system performance requirements<br>Discuss system performance factors<br>Analyse processor performance enhancement techniques<br>Analyse live system configuration (data backup, viruses etc) |

## Recommended Learning Resources:
## Data Recovery & System Configuration

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| **Text Books** | **Data Recovery**<br>• Data Recovery Tips & Solutions: Windows, Linux, and BSD by Kris Kaspersky.  ISBN-10: 1931769567<br>• Guide to Data Recovery by Paul Mace.  ISBN-10: 0136544274<br>• Que's Guide to Data Recovery by Scott Mueller.  ISBN-10: 0880225416<br><br>**System Configuration**<br>• System Center Configuration Manager (SCCM) by Kerrie Meyler, Byron Holt, Greg Ramsey & Anthony Puca.  ISBN-10: 0672330237<br>• System Center Configuration Manager by Brad Price & Daniel Eddy.  ISBN-10: 1435456505<br>• Mastering System Center Configuration Manager 2007 by Chris Mosby, Ron D. Crumbaker & Christopher W. Urban. ISBN-10: 047017367X |
| **Study Manuals** | BCE produced study packs |
| **CD ROM** | Power-point slides |
| **Software** | Windows Operating Systems and Data Recovery Software |