



CPD

Data Centre Fundamentals
Explained



ACCREDITED DATA CENTER FUNDAMENTALS EXPLAINED (ADCF):

This course series targets data center facility operators, IT Infrastructure Managers, Infrastructure Designers/Consultants/Auditors and Data Centre Owners.

The course series is designed to cater for professionals with varying professional backgrounds within the Data Centre field, or even for Data Centre enthusiasts.

The items covered range from common buzzwords and acronyms to a thorough description of all the physical elements that fit together as a jigsaw to complete a Data Centre build. These elements include the Electrical, Mechanical, IT, and Security infrastructure traditional elements, and an additional insight into their energy efficient enhancements and renewable energy alternatives.

Series Introduction

- a. Buzzwords
- b. The Data Center and the Human

Course 1: Power Systems Explained

- a. High Voltage Systems
- b. Transformers
- c. Low Voltage Systems
 - i. Panels
 - ii. Breakers
- c. Generators
- d. Uninterruptible Power Supplies (UPS) Systems
- e. Power Distribution
- f. Static Transfer Switches (STS)
- g. Manual/Automatic Transfer Switches (MTS)
- h. Earthing
- i. Power Management System (PMS)
- j. Useful Power Equations

Course 2: Mechanical Systems Explained: HVAC

- a. What is Cooling?
- b. Refrigeration Cycles
- c. Fans
- d. Ducts
- e. Cooling Towers
- f. Chillers
- g. Chilled Water Piping Systems
- h. Computer Room Air Handling (CRAH) units
- i. Computer Room Air Conditioning (CRAC) units
- j. Air Handling Units (AHUs)
- k. Packaged Air Conditioning (PAC) units
- l. VAVs, CAVs, FCUs
- m. Psychrometrics
- n. Heat Exchangers
- o. Air Filtration
- p. Thermal Energy Storage (TES)
- q. Useful Equations

Course 3: Other Mechanical Systems Explained

- a. Humidification
- b. Water Leak Detection
- c. Drainage
- d. Fire Prevention, Suppression and Detection
 - i. Smoke and Heat Detection
 - ii. Aspiratory Detection and Sensing
 - iii. Sprinkler Systems
 - iv. Gas Suppression Systems
 - v. Hypoxic Systems
- e. Building Management Systems (BMS)

Course 4: Other Essential Overviews Explained

- a. Cabling Types
 - i. Copper
 - ii. Fibre
- b. Structured Cabling basics
- c. Labelling basics
- d. Storage: DAS vs NAS vs SAN

Course 5: Physical Security Explained

- a. Operational Requirements
- b. Zoning
- c. Perimeter Security
- d. Access Control
- e. Closed Circuit Television (CCTV)

Bonus Course (non-CPD): Architectural, Civil, & Structural Explained

- a. Location selection
- b. Prefabricated vs Modular vs Traditional builds
- c. Whitespace requirements
- d. Floor
 - i. Slab strength
 - ii. Underfloor Air Distribution (UFAD)
 - iii. Floor grilles
- e. Special Needs and Requirements (incl. EMI, EMP Shielding, channel bases and seismic. Including flexi pipes)
- f. Critical infrastructure Space & Access needs

ABOUT THE ACCREDITATION

The Chartered Institute of Building Services Engineers (CIBSE) Directory of Continuing Professional Development (CPD) Course Providers is a comprehensive list of companies offering educational learning that CIBSE members can receive in-house or attend as part of their on-going continuing professional development. All seminars/courses are reviewed and assessed by CIBSE to ensure that the technical content is of a high standard and offers valuable CPD to delegates.

CIBSE is committed to maintaining and enhancing professional excellence. The Directory of CPD Course Providers is used by a large number of members who request companies to deliver in house CPD.

CIBSE is a professional membership body with over 19,500 members in 97 Countries worldwide. All members are required to undertake continuing professional development (CPD) in order that they keep up to date with the latest technical information and maintain their professional competence.

ABOUT THE COURSE SERIES

The course material has been hand-picked and selected from various standards and guidelines worldwide, to produce the most effective, practical, logical, and advanced solutions for mission critical builds such as data centres.

These references have been improved, combined, or edited based on the experience of C-sulTe founders, to produce the best educational, and design and operations aid.

The course delivery and content style is designed to cater for both Visual and Auditory type Learners as recommended by top educational standards such as Higher Education Academy (UK).

ABOUT THE AUTHORS & INSTRUCTORS

Dr. Hussein Shehata, CEng, BA, PhD, PGDip, MASHRAE, MIET, MCIBSE, ATD, ATS
Founding Partner at C-sulTe

Over 22 years career in:

- *Research & PhD in Energy Efficiency & HVAC*
- *Lecturer, Exams Officer, IT Rep, Course Director (Uni. of Nottingham, UK)*
- *Postgraduate teaching diploma (Higher Education Academy - HEA, UK)*
- *Co-founder of Critical Systems Engineering for Global Consulting Group (Tokyo)*
- *Asia-Pacific Head of Data Center Engineering for JP Morgan Chase*
- *EMEA Technical Director for Uptime Institute*
- *Published and presented technical papers, and white-papers*
- *Created tools to enhance Data Center deliverables*

Mohammed 'Mo' Shehata, BEng, MSc., CEng, MIET
Founding Partner at C-sulTe

Over 18 years Working Experience in:

- *Mission Critical Sector*
- *Global Experience in APAC, Australia, Europe, North America and MENA Founder of Engineering and Data Centre Division for International Consultancy Firm*
- *Global Head of Engineering and Global Head of Data Centres for International Consultancy Firm*
- *Presented in various conferences*
- *Published white papers*
- *Created tools to enhance Data Center deliverable*

RESOURCES

Standards and publications referenced include but are not limited to:

- *UFAD design guide-ASHRAE Technical Committee 9.9, (The American Society of Heating, Refrigerating, and Air-Conditioning Engineers – ASHRAE), US*
- *Thermal Guidelines for Data Processing Environments, ASHRAE*
- *The Commissioning Process, Guideline 2005, ASHRAE*
- *Design Considerations For Datacom Equipment Centres, ASHRAE*
- *Datacom Equipment Power Trends and Cooling Applications, ASHRAE*
- *ANSI/TIA-942-A-2012 (American National Standards Institute, Telecommunications Industry Association), US*
- *BSRIA Commissioning set - 7 books, UK*
- *CIBSE Guide B: Heating, Ventilating, Air Conditioning and Refrigeration, UK*
- *CCTV Operational Requirements Manual (Home Office Scientific Development Branch), UK*
- *NFPA 13 (National Fire Protection Association), US*
- *Physical Security Guide - Lead Agency Publication G1-006 (Royal Canadian Mounted Police - RCMP), Canada*
- *DEFENCE ESTATE ORGANISATION, Ministry of Defence, UK*
- *Ministry of Defence Federal Emergency Management Agency, US*



Our Philosophy

VAK

Visual learners:

Use graphs, charts, illustrations, or other visual aids.

Include outlines, concept maps, agendas, handouts, etc. for reading and taking notes.

Include plenty of content in handouts to reread after the learning session.

Leave white space in handouts for note-taking.

Invite questions to help them stay alert in auditory environments.

Post flip charts to show what will come and what has been presented.

Emphasize key points to cue when to take notes.

Eliminate potential distractions.

Supplement textual information with illustrations whenever possible

Auditory learners :

Begin new material with a brief explanation of what is coming. Conclude with a summary of what has been covered. This is the old adage of “tell them what they are going to learn, teach them, and tell them what they have learned.”

Include auditory activities, such as brainstorming, buzz groups, or Jeopardy. Leave plenty of time to debrief activities

Kinesthetic learners:

Use activities that get the learners up and moving..

Have them transfer information from the text to another medium such as a keyboard or a tablet