

# Certified Data Centre Specialist (CDCS®)

**Duration:** 3 Days

## Course Description:

CDCS® (Certified Data Centre Specialist) is a 3-day advance level for training data centre design/build professionals. The CDCS® course will cover engineering calculations on the various components in a data centre facility. CDCS® will further increase attendees' competences to a level of a compatible sparring partner with suppliers and verify offers provided by vendors for correctness, effectiveness and efficiency.

CDCS® is the second training in the EPI Design and Build training track under the EPI Data Centre Training Framework. Participants must hold a valid CDCP® certificate in order to be able to register for the CDCS® class. CDCS itself is a pre-requisite for persons wishing to achieve the CDCE® status.

## Target Audience:

The primary audience for this course is an IT, Facilities or Data Centre Operations professional working in and around the data centre (representing both end-customers and/or service provider/facilitators) and having responsibility to achieve and improve high availability and manageability of the Data Centre, such as: Data centre managers, Operations / Floor / Facility managers, data centre engineers, network/system engineers, data centre sales/consultants.

## Course Outlines:

### Data Centre Design/Life Cycle Overview

- Overview of the phases of a data centre life cycle
- Planning, re-alignment and continuous improvement

### Standards and Rating Level Definitions

- Rating level history
- Standards and guidelines compared (TIA-942, ISO 22237, EN 50600, UTI)
- Rating level definitions
- Redundancy options (N+1), 2N, 2(N+1)
- Concurrent Maintainability/Compartmentalisation
- Example configurations
- Substation and feed requirements
- Maintenance options
- Operational processes guidelines/standards
- Skill development

### Building Considerations

- Building location considerations
- Floor and hanging loads requirements
- Fire rating for walls and glass
- Blast protection
- Bullet proofing
- Forced entry protection

### Advanced Raised Floor & Suspended Ceiling

- Raised floor installation guidelines
- Techniques to install a proper and leveled raised access floor
- Common mistakes
- Choosing the right tiles and their locations
- Seismic-mitigating floor constructions
- Choosing the correct suspended ceiling

### Advanced Power

Power infrastructure layout;

- Formulas which you should know for the data centre
- Single Line Electrical diagrams; how to read to ensure key components are present for protection
- Over current protection devices (MCB/MCCB/VCB/ACB/Fuses) definitions and what to use where
- Earth Leakage devices (RCB/RCD/ELCB/GFCI/ALCI/RCBO), definitions and what to use where
- Sizing of protective components
- Lightning strikes and surge protection devices (TVSS/SPD), how they operate, where to use and how to install
- Power cabling and cable run considerations
- PDU/DB setup and minimum requirements

- Generators;

- Generator types: Standby/Prime/Continuous
- Component make up and functions
- Fuel storage and calculation
- Paralleling of gen-sets
- Generator room/area requirements

- UPS Systems;

- Required specifications for UPS systems
- How to read data sheets and select the correct UPS
- Requirements for parallel configurations and avoid pitfalls such as single point of failures
- How parallel installation should be done, classic mistakes made by installers and how to avoid these

- Harmonic Filters;

- Active/Passive filters and their application

- Battery Banks;

- Battery bank terminology
- Designing battery banks, how to calculate, and double check the battery bank to be installed
- Battery charging pitfalls and ensuring the right charger is being installed and used
- Using parallel battery banks; how to properly install them, limitations and risks when using batteries in parallel
- How to test batteries correctly and make decisions on cell/block or string replacement
- Battery casing choices; ABS, V0, V1, V2
- Alternative energy storage; flywheel, re-usable cell, compressed air UPS, etc.

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## COURSE OUTLINE

### Advanced Electro Magnetic Fields

- Sources of EMF
- Difference between single, three phase and bus-bar EMF
- Options available to measure EMF and how to interpret the results from single-axes and composite measurements
- Guidance on safe distance for equipment and humans
- Calculation of EMF attenuation factor for shielding material permeability and saturation factors

### Advanced Cooling

- Important definitions; dry-bulb, wet-bulb, dewpoint, RH, sensible and latent heat
- Psychometric chart and ASHRAE recommendations
- Environmental class definitions and thermal specifications
- Temperature/humidity measurements guideline
- Heat dissipation methods
- Altitude impact on temperature intake to ICT equipment
- Floor plan setup for effective cooling
- Differences in tile surface and supporting structure and the air-flow performance impact
- Rack door construction and the flow performance impact
- Equipment Delta-T and its impact
- Optimizing airflow
- Thermal units' conversions
- Calculations for air volume displacement (CFM/CMH)
- Cooling capacity calculations
- Air-conditioning selection
- De- / humidifying options
- Air conditioning efficiency
- SHR impact on cost saving
- Efficiency indicator
- New cooling principle and techniques (Submerged, VSD/VRF/ECF/water- and air side economizers)
- Redundancy guidelines for air-conditioners avoiding classic misconceptions and mistakes for meeting ANSI/TIA-942 compliant designs
- Installation requirements
- Connections to fire panel and EPO
- Commissioning of air conditioners
- Set points and calibration
- CFD (Computational Fluid Dynamics)

### Advanced Fire Protection

- The fire triangle and elements to stop a fire
- Detection systems in detail (VESDA, VIEW, smoke sensors)
- Considerations for installation of sensors
- Proper testing of smoke sensors
- Water based systems i.e. deluge, wet-pipe, dry-pipe, pre-action and why most of them don't work and how to detect this
- Details on Inert and Halocarbon systems and how to select the correct system for your data centre
- How to calculate the gas content ensuring the appropriate level is installed to suppress the fire including safety considerations
- Other requirements for gas systems such as release times, hold times, pipe install requirements and other important factors
- Requirements for the fire detection panel
- Installation verification, methods, what to check and how
- New advanced fire suppression technologies

### Design and Install Scalable Networking Cabling System

- ANSI/TIA942 cabling structure topology
- Copper and fiber cabling
- ToR, EoR Design
- Intelligent patching systems
- Installation best practice such as routing, bending radius, separation from power, containment fill ratio, fiber link loss calculator, bonding and grounding requirement
- Standard for telecommunications labeling and administration

### Environmental Specifications and Contamination Control

- Acoustic noise effects, regulations, specifications and limits
- Data centre contaminations and classifications
- Measurements, standards and limits
- Preventive measures and avoidance

### Data Centre Efficiency

- Business drivers to go Green
- Sustainability versus high availability
- Green guidelines and standards
- Power Usage Effectiveness (PUE), values, classes, considerations and improvements
- Open Compute Project (OCP)
- Savings on cooling infrastructure
- Savings on light infrastructure

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