Certified Data Centre Specialist (CDCS®)

Course Outline

Data center Design/Life Cycle Overview

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

Standards and Rating Level Definitions

- Rating level history
- Difference between Uptime and TIA-942
- 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

A**dvanced 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 center
- 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: Standy/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.

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, dew-point, 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 economisers)
- 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 center
- 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
- 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 center contaminations and classifications
- Measurements, standards and limits
- Preventive measures and avoidance

Data center Efficiency

- Business drivers to go Green
- High-availability or Green?
- Green guidelines and standards
- How to measure it and what are acceptable numbers compared to the general industry
- PUE classes defined by Green Grid and issues with PUE
- Techniques for saving energy in all parts of the data center i.e. application/system level, cooling, power distribution