



## Certified Data Centre Specialist

### Introduction

With few exceptions, enterprises today rely on IT for the delivery of business-critical services - often directly to the end consumer. It is therefore vital that the mission critical data center is designed, maintained and operated with hi-availability and efficiency in mind. Fact is however that most data center's do not meet the full availability, capacity, safety or efficiency requirements often demanded.

CDCS™ will further specialize attendees to a level where they will be a compatible sparring partner with suppliers and will be able to verify offers provided by vendors for correctness, effectiveness and efficiency. CDCS™ is a must have certification for professional data centre managers and personnel. CDCS™ is a pre-requisite for persons wishing to achieve the CDCE™ status.

### Certified Data Center Courses

There are three levels of certification for Mission Critical Site Facilities courses:

- CDCP™: Certified Data Center Professional
- CDCS™: Certified Data Center Specialist
- CDCE™: Certified Data Center Expert

For data center operations we have developed the course:

- CDOM™: Certified Data Center Operations Manager

### Audience

The primary audience for this course is an IT, Facilities or Data Center Operations professional working in and around the data center and having responsibility to achieve and improve hi-availability and manageability of the data center.

### Prerequisites

Participants must hold a valid CDCP™ certificate in order to be able to register for the CDCS™ class.

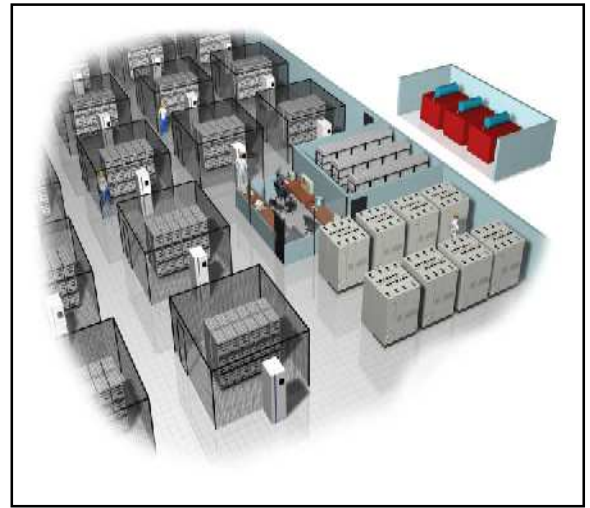
### Delivery Structure

This is an instructor-led course that uses a combination of presentation lectures and question and answer sessions to discuss attendees specific needs and issues experienced in their own environment. Attendees are able to tap on the trainer's extensive experience to solve practical problems in their current environment adding tremendous value.

### The Trainer

This course will be delivered by a data center veteran with many years of experience in designing and auditing of data center's world wide.

With many audits performed world-wide you can be assured that the trainer has done it all and seen it all and provides excellent practical experience and insights in what works and what doesn't work when it comes to setting up, maintaining and running mission critical sites.



Would you like to join the elite group of  
Certified Data Center Professionals?

World-Wide accredited by:



### Benefits realized

After completion of the course the you will be able to:

- Understand the design life cycle of data centers and the stages involved
- Discuss in great level of detail requirements with vendors, suppliers and contractors and ensure that they do the right thing for the customers business and not what is right for the vendor
- Verify on the technical level design plans, quotes and offers proposed by vendors/contractors
- Understand Tier-levels for both the data center design/setup as well as maintenance tier levels
- Understand the various building considerations such as bullet proofing, mitigation of seismic activity, fire ratings and thermal stability
- Understand how to build up a raised floor and making sure it is done properly to avoid misalignment, level differences and leakage
- Understand how to read Single Line Electrical Diagram and taking out the most common design issues made.
- Choose the right UPS and parallel configuration, learn how to make sure that classic mistakes when installing parallel systems can be avoided
- Understand how to calculate battery banks enabling you to double check offered configurations ensuring they meet your requirements
- Understand what distance to keep to avoid EMF issues for human safety and equipment disturbances
- Understand all about cooling setup and CFM, Delta-T and other important factors
- Understand contamination factors and limitations
- Understand full details of fire suppression options, how to calculate gas content and verify installations
- Understand how to measure data center energy efficiency and how to improve it
- And much, much more...



## Course Syllabus

### Day 1

- **Data center design/life cycle overview**
  - Overview of the phases of a data center life cycle
  - Planning, re-alignment and continuous improvement
- **Tier levels**
  - History of 'tier level' definitions
  - Tier level definitions, categories and measure points
  - Redundancy options
  - Tiered Infrastructure Maintenance Standards (TIMS)
- **Building considerations & standards**
  - Floor loading requirements
  - Fire rating for walls and glass
  - Blast protection
  - Bullet proofing
  - Forced entry protection
- **Advanced raised floor & suspended ceiling**
  - Raised floor installation guidelines to ensure contractors install a proper closed and leveled raised access floor
  - Choosing the right tiles and their locations
  - Seismic mitigating floor constructions
  - Choosing the right suspended ceiling
- **Advanced Power**
  - **Power infrastructure layout;**
    - Formulas which you should know for the data center
    - Single Line Electrical diagrams; how to read them and ensuring 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
    - Lightning strikes and surge protection devices (TVSS/ SPD), how they work and where to use and how to install
    - Power cabling and cable run considerations
    - PDU/DB setup and minimum requirements
  - **Generators;**
    - component make up,
    - choosing the right one,
    - calculate required fuel storage tank capacity,
    - Paralleling of gen-sets
    - meeting regulatory requirements
  - **UPS systems;**
    - Required specifications for UPS systems
    - How to read data sheets and select the right UPS
    - Requirements for parallel configurations and avoid pitfalls such as single point of failures
    - How parallel installation should be done, classic mistakes which installers make and how to avoid them
  - **Harmonic filters;**
    - Type of filters available and which one to select depending on the application
  - **Battery banks;**
    - 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 risk 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-useable cell etc.

### Day 2

- **Advanced Electro Magnetic Fields**
  - Differences between single, three phase and bus-bar EMF
  - Options available to measure EMF and how to interpret the results from single axe 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**
  - Environmental class definitions and thermal specifications
  - Equipment airflow and Delta-T definitions and limits
  - Planning for floor, rack and cooling equipment
  - CFM requirement calculations and conversions
  - Air-conditioner specifications and how to select the right air-conditioner with the right capacity and flow
  - Techniques for optimization of air flow
  - Redundancy guidelines for air-conditioners (no, it is not just N+1....)
  - Liquid cooling guidelines for data centers
- **Advanced fire protection**
  - Fire triangle and elements to stop a fire
  - Detection systems in detail (VESDA, VIEW, Smoke sensors)
  - Considerations for installation of sensors
  - Difference in water based systems i.e. dry-pipe, pre-action and why most of them don't work and how to detect this
  - Details on Inert, Halocarbon, fluorinated systems and how to select the right gas for your data center
  - How to calculate the gas content ensuring the appropriate level is installed to suppress the fire
  - Other requirements for gas systems (release times, hold times, pipe install requirements and other important factors)
  - Requirements for the fire panel
  - Installation verification, what to check and how
  - New fire suppression techniques which prevents fires from even starting..... No more fire suppression gas cylinders...
- **Cable management**
  - Data center infrastructure cabling
  - In rack power and network cabling
  - Labeling based on TIA-606

### Day 3

- **Environmental specifications**
  - Acoustic noise regulations, specifications, effects and limits
  - Data center contaminations and classifications
  - Measurements, standards and limits
  - Preventive measures and avoidance
  - Electro Static Discharge (ESD)
- **Data center efficiency**
  - Power efficiency indicators
  - How to measure it and what are acceptable numbers compared to the general industry
  - How to achieve power savings in the data center; various techniques to save energy in all parts of the data center i.e. application/system level, cooling, power distribution
- **Question and Answers and exam preparation (if time permits)**
- **EXAM: Certified Data Center Professional**

## Certification & Accreditation

Certification exams will be administered at the end of the last day of the course. The exam is a one and half hour, 60 questions, closed book exam. Results of the exam pass/fail will be communicated to the attendee within four weeks after the examination. Attendees who pass the exam will receive the official "Certified Data Center Specialist" Certificate. This world-wide recognized certificate is accredited by 'The ICOR Group'. ICOR operates world-wide and is a not-for-profit education and credentialing organization that provides professional development, certification, thought-leadership, and the latest in research and industry trends in the area of organizational resilience.

