Certified Data Centre Design Professional (CDCDP®) Training

Duration: **5 Day**

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Overview

Develop a comprehensive data centre design that supports critical business requirements while examining the main constraints that influence data centre performance. The program focuses on creating balanced, efficient and sustainable design solutions.

The Certified Data Centre Design Professional (CDCDP®) program is designed for professionals who want to demonstrate advanced technical knowledge of data centre architecture, infrastructure components and the operating conditions associated with them.

This five-day program examines the principal elements involved in data centre design. It covers recognised best-practice principles for the planning, construction and operation of computer rooms, data centre environments and supporting operational facilities.

Particular attention is given to the accurate interpretation of detailed customer requirements during the planning phase. This helps ensure that business needs remain central to design decisions throughout the entire project lifecycle.

Learners examine key areas of physical infrastructure, including electrical distribution, cooling, data cabling and building support systems. The program concludes with a comprehensive case study that follows the design process from initial concept through to commissioning. The exercise incorporates the business decisions, design scope and implementation stages that must be addressed throughout the project.

Certified CDCDP® professionals are also expected to understand compliance requirements, including relevant national and international regulations, codes and standards. During the program, learners have an opportunity to access and review current industry standards.

After completing the program, learners are encouraged to continue their professional development. Progression through The Global Digital Infrastructure Education Framework supports further recognised certifications and qualifications and provides career development opportunities across the network infrastructure and data centre sectors.

Prerequisites

Previous experience working within a data centre environment is essential. Ideally, learners should have around two years of experience in a technical IT, operations or facilities-based role.

If you would like to discuss your existing experience or suitability for the program, please contact us.

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What You Will Learn

Individuals who successfully achieve the CDCDP® certification will develop advanced knowledge, expertise and capability to create comprehensive data centre designs that support both ongoing operational requirements and wider business needs.

Outline

What is a Data Centre?

- Understanding the data centre concept
- The data centre stack
- Types of data centre

The Design Planning Process

- Main design considerations
- Developing a project plan
- Defining the scope of requirements
- Identifying key stakeholders
- Market and political drivers
- National and international standards
- Availability and resilience classifications
- Introduction to availability models:
  - Uptime Tier
  - TIA-942-B Rating
  - BICSI Classes
  - Syska Hennessy Critical Levels
- Recommendations for location, size, height, floor loading, lighting and décor

White Space Floor Design

- National and international standards
- Structural and load requirements
- Recommended raised-floor heights
- Airflow and sealing
- Ramps and access
- Seismic protection
- Slab-floor construction considerations

Cabinets

- Cabinet requirements
- Security, safety and stabilisation
- Clearance, accessibility and ventilation
- Cable management
- Seismic stability considerations
- Design specifications

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Power

- Regulations and codes
- Understanding N, N+1 and 2(N+1) resilience models
- Power delivery and distribution losses
- Uninterruptible Power Supply (UPS) options
- Generator design considerations
- Power Distribution Units (PDUs)
- Power distribution to and within racks
- Remote Power Panels (RPPs)
- Emergency Power Off (EPO)
- Estimating power requirements

Cooling

- National and international standards
- Fundamental air-conditioning principles
- CRAH and CRAC systems
- ASHRAE operating parameters
- Under-floor plenum approaches
- Hot aisle / cold aisle layouts
- Hot and cold aisle containment
- Psychrometric charts
- Minimum and maximum under-floor air throw distances
- Bypass and recirculation
- Airflow management
- Chilled-water rack solutions
- CO_2 cooling
- Free-air cooling

Earthing and Bonding

- Applicable standards
- Earthing, grounding and bonding terminology
- Equipotential bonding
- Electrostatic Discharge (ESD)
- Functional earths
- Signal Reference Grid (SRG)

Cable Containment, Management and Protection

- Applicable standards
- Separation of power and data cabling
- Administration and labelling
- Conduit, trunking and tray options
- Earthing and bonding
- Containment fill ratio
- Under-floor versus overhead containment
- Cable management to and within racks
- Fire stopping

Delivering the IT Strategy

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- Data centre equipment
- Current and future functions and protocols
- Data centre connectivity
- Cabling requirements
- Cabling standards
- Cabling options
- Impact of 40G and 100G
- Impact of virtualisation

Copper and Optical Fibre Connectivity

- Cabling standards
- 10GBASE-T, CAT6A, Cat 7A and Cat 8
- Screened and unscreened cabling
- High-density patching
- Alien crosstalk
- Copper testing requirements
- Designing for growth
- Channel connections
- Connection topologies
- Historic and current optical connectors
- Optical fibre management
- Types of optical fibre cable
- Pre-terminated cabling
- Advantages and disadvantages of pre-termination
- Optical component loss and link power budgets
- Application link loss
- Optical testing requirements

Safety and Manageability

- Local codes and regulations
- Fire safety plans
- ASD and detection systems
- Fire suppression
- Fire-safe cabling requirements
- Security and access control

Commissioning and Handover

- Benefits of commissioning
- Commissioning processes and test sequences
- Handover processes
- Operational training
- Lessons learned

Power Review

Power Consumption and Energy Conditions

- Power consumption trends
- Energy availability

- Energy security
- Energy cost
- Energy challenges affecting data centres

Power Regulations

- Regulations affecting data centres
- Environmental requirements and pressures
- Energy and environmental programs

Power Basics

- Ohm's law
- Joule's law
- Kirchhoff's laws
- Electrical parameters
- AC and DC
- Single-phase and three-phase systems
- Residual currents
- Harmonics

Power to the Data Centre

- Understanding where electricity comes from
- Electrical supply options
- Transformers
- Surge suppression devices
- Cost of electrical power
- Tariff options
- Alternative power supply options

Distribution in the Data Centre

- Electrical circuit requirements
- Switching devices
- Power factor correction units
- Automatic and static transfer switches
- Main, feeder and sub-main circuits
- Power Distribution Units
- Remote Power Panels
- Final circuits
- Cable and fuse sizing
- Power distribution and related losses
- TN-S systems
- Energy efficiency

Standby Power

- UPS components
- Batteries
- Redundant UPS systems
- UPS options and considerations
- Static and maintenance bypasses

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- Standby generators

Cooling Review

Cooling Requirements

- Data centre limiting factors
- Sources of cooling inefficiency
- Cooling trends

Regulatory Climate

- Regulations affecting data centres
- Environmental pressures
- Cooling efficiency
- Design considerations and redundancy planning
- Overview of Computational Fluid Dynamics (CFD)
- Periodic review processes

Environmental Parameters

- NEBS, ETSI and ASHRAE standards
- Operating environment ranges
- Rate of change
- ASHRAE psychrometric charts
- Humidification systems
- The need for sensors
- Measuring and monitoring

Collecting the Heat

- Cooling system overview
- CRAC and CRAH systems
- Maximising existing investment
- Rack versus row approaches
- Airflow dynamics and common problems
- Liquid cooling
- Comparison of high-density cooling methods
- Available cooling options

Heat Rejection or Reuse

- Heat transfer considerations
- DX systems
- Chilled-water CRAHs
- Chiller options
- Adiabatic cooling
- CWS and CHWS plant
- Design considerations
- Free cooling and free-air cooling
- Commissioning and maintenance
- Planned preventive maintenance

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Energy Use Systems

- Energy efficiency issues
- Layers of inefficiency
- Power system provisioning
- Cooling system provisioning
- Identifying areas for improvement

IT Infrastructure

- Extending the operating envelope
- Environmental zones
- Accurate IT calculations
- Energy use within IT equipment
- Software and storage considerations
- Transformation options
- Energy-efficient IT equipment

Power Systems

- Energy use in the data centre
- DC power train
- Matching support infrastructure to the IT load
- Transformer efficiency
- UPS and motor efficiency
- DCiE for modular provisioning
- Maximising power factor
- Measurement and monitoring
- Infrared inspections
- Planned electrical safety inspections
- Implementing data centre electrical efficiency

Cooling Efficiency

- Cooling as a cascade system
- Affinity laws and cooling equations
- CRAC and CRAH efficiency
- Optimising air-side and water-side systems
- DCiE for cooling options
- Diagnostic and site-specific monitoring
- Design considerations

Data Centre Metrics

- What can be measured and where
- The metric stack
- Characteristics of effective metrics
- Current industry metrics:
  - PUE
  - CUE
  - WUE
  - ERE

    - RCI
    - RTI
- Chained value metrics:
    - CADE
- Proxy metrics:
    - FVER
    - DPPE
    - DCeP

Efficiency Models and Best Practices

- Energy calculations
- Levels of modelling
- Modelling tools
- Sources of guidance
- Effective versus efficient
- Communication barriers across data centre disciplines
- The multifunctional team
- Designing for efficiency, operability and flexibility
- Industry-recognised best practices

Design Management

Project Management Characteristics

- Core characteristics of project management
- Key project processes
- Identifying and engaging key stakeholders
- Goal setting
- Prioritisation of activities
- Core project management foundations

Managing the Design Process

- Defining what is to be delivered
- Identifying project constraints
- Managing dependencies
- Coordinating different disciplines and teams
- Conflict management
- Identifying risk
- Risk and issue management
- Change management
- Reporting and communication

Managing the Design Implementation Process

- Project charter and specification
- Risk assessment and management
- Scope management
- Float and critical path
- Human resource management
- Project integration and Work Breakdown Structure

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- Time and cost management
- Handover and progressive acceptance