BOOST
THE LEADING TRAINING PROVIDER

Digital Transformation and Innovation

Data Centre Design Professional

Course Introduction

This Certified Data Centre Design Professional (CDCDP) program is designed to provide participants with the key elements associated with designing a data center. This course will allow participants to practice principles for the design, construction and operation of computer rooms and data center operational support facilities. The program also addresses the importance of accurate interpretation of detailed customer requirements at the planning stage to ensure that the business needs remain focal to all decision making.

This course will also discuss the key elements of physical infrastructure, electrical distribution systems, air-conditioning, data cabling and building support systems. It will conclude with a comprehensive case study exercise that guides learners through the design steps from initiation to commission, covering the business decisions, design scope and implementation phases that need to be addressed throughout all aspects of the process.

Target Audience

1. Data Center Architect
2. IT Infrastructure Manager
3. Network Engineer
4. Systems Engineer
5. Cloud Architect
6. Data Center Operations Manager
7. Facilities Manager
8. Enterprise Architect
9. IT Consultant
10. Chief Technology Officer (CTO)

Learning Objectives

- Design projects for implementation within a data centre facility
- Create a comprehensive data centre design to meet on-going operational and business needs.

Course Outline

- **Day 01**

  What is a Data Centre?

  - The data centre stack
  - Types of data centre

  The Design Planning Process

  - Main design considerations
  - Developing a project plan

  Scoping the Requirement

  - 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, heights, floor loading, lighting and décor

  Whitespace Floor

  - National and international standards
  - Structural and load requirements
  - Recommended floor heights
  - Airflow and sealing

- Ramps and access
- Seismic protection
- Slab floor construction considerations

Cabinets

- Requirements of a cabinet
- Security, safety and stabilisation
- Clearance, accessibility and ventilation
- Cable management
- Seismic stability considerations
- Design specifications

Power

- Regulations and codes
- The meaning of N, N+1 2(N+1), etc
- Power delivery and distribution losses
- Uninterruptible Power Supply (UPS) options
- Generator considerations
- Power distribution units
- Power distribution to, and in a rack
- Remote Power Panels (RPPs)
- Emergency Power Off (EPO)
- Estimating power requirements

Cooling

- National and international standards
- Basics of air conditioning principles
- CRAHs and CRACs
- ASHRAE Operational parameters
- Under floor plenum approach
- Hot aisle/cold aisle layout principle
- Hot and cold aisle containment
- Psychrometric charts
- Min and max throw distances for under floor air
- Bypass and recirculation
- Airflow management
- Chilled water racks, CO2, free air cooling

• **Day 02**

Earthing & Bonding

- Applicable standards
- The terminology of earthing, grounding & bonding
- Equipotential bonding
- Electrostatic Discharge (ESD)
- Functional earths
- The Signal Reference Grid (SRG)

Cable Containment, Management & Protection

- Applicable standards
- Separation of power and data cables
- Administration and labelling
- Types of conduit, trunking, tray, etc, available
- Earthing and bonding
- Containment fill ratio
- Underfloor v overhead containment
- Cable management, in and to a rack
- Fire stopping

Delivering the IT Strategy

- Data centre equipment
- Functions and protocols, current and future
- Data centre connections
- Cabling requirements
- Cabling standards
- Cabling options
- The impact of 40G and 100G
- The impact of virtualisation

Copper and Optical Fibre Cabling Connectivity

- Cabling standards
- Cable standards, 10GBASE-T, CAT6A & Cat 7A & Cat 8
- Screened vs unscreened cables
- High density patching
- Alien crosstalk
- Copper test requirements
- Design for growth management
- Channel connections
- Connection topologies

- Optical connectors, past and present
- Optical fibre management
- Types of optical cable
- Pre-terminated cabling
- Advantages/disadvantages of pre-terminating cables
- Optical component loss and link power budgets
- Application link loss
- Optical testing requirements
- Pre-terminated cabling

Safety and Manageability

- Local codes and regulations
- Fire safety plan
- ASD and detection systems
- Fire suppression systems
- Fire safety cable requirements
- Security and access control

• **Day 03**

Commission and handover

- Benefits of commissioning
- Commission process and test sequence
- Handover process and training
- Lessons learned

Power Review

- Power consumption trends
- Energy availability, security and cost
- Energy challenges facing the data centre

Power Regulations

- Which regulations affect data centres?
- Environmental regulations and pressures
- Energy and environmental programs

Power Basics

- Ohm’s law, Joule’s law, the Kirchhoff laws
- Electrical parameters
- AC and DC

- Single phase and three phase
- Residual currents
- Harmonics

Power to the Data Centre

- Where does the electricity come from?
- Electrical supply options
- Transformers
- Surge suppression devices
- Costs of electrical power
- Types of tariff available
- Alternate power supply options

Distribution in the Data Centre

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

Standby Power

- UPS components, batteries and redundant systems
- UPS options and considerations
- Static and maintenance bypasses
- Standby generators

Cooling Review

- Data Centre limiting factors
- Sources of cooling inefficiencies
- Cooling trends

Regulatory Climate

- Which regulations affect data centres?
- Environmental pressures
- Cooling efficiency
- Design considerations & planning redundancy
- Overview of Computational Fluid Dynamics (CFD)
- Periodic review process

Environmental Parameters

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

- **Day 04**

Collecting the Heat

- Cooling system overview
- CRACs and CRAHs
- Maximising existing investment
- Rack v row options
- Dynamics and problems of air flow
- Liquid cooling
- Comparison of high-density cooling
- 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 maintenance
- Planned preventative maintenance

Energy Use Systems

- Energy efficiency issues
- Layers of inefficiency
- Power system provision
- Cooling system provision
- Understanding areas of improvements

IT Infrastructure

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

Power Systems

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

Cooling Efficiency

- Cooling, a cascade system
- Affinity laws and cooling equation
- CRAC and CRAH efficiencies
- Optimising air-side systems & water-side systems
- DCiE for cooling options
- Diagnostic and site specific monitoring
- Design considerations

• **Day 05**

Data Centre Metrics

- Where and what can we measure?
- The metric stack
- Metric characteristics
- Current industry metrics (PUE, CUE, WUE, ERE, RCI & RTI)
- Chained value metrics (CADE)
- Proxy metrics (FVER, DPPE, DCeP)

Efficiency Models & Best Practices

- Energy calculations
- Levels of modelling
- Modelling tools
- Sources of guidance
- Effective v Efficient
- The DC language barrier
- the multi-functional team
- Design for efficiency, operability & flexibility
- Industry recognised best practices

Design Management

- Characteristics of project management
- Key project processes
- Identifying and engaging with key stakeholders
- Setting goals
- Prioritisation of activities
- Cornerstones of project management

Managing the Design Process

- What is to be delivered?
- What constraints are there?
- Managing dependencies
- Managing the tribes
- Managing conflict
- 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
- Time and cost management
- Handover and progressive acceptance

Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
April 14, 2025	April 18, 2025	5 days	4950.00 $	Austria - Vienna
Sept. 22, 2025	Sept. 26, 2025	5 days	4250.00 $	UAE - Dubai
Dec. 22, 2025	Dec. 26, 2025	5 days	4250.00 $	UAE - Abu Dhabi