Customer Focused
Quality Driven

The **Global Leader** in **Technical Education**
for the **Digital Infrastructure Industry**

Design

CDCDP®

Certified Data Center Design Professional

BTEC Level 5 Professional Award

Certified Data Center Design Professional (CDCDP®)

Program Overview

Learn how to scope, plan and implement a data center design to meet the ever expanding demands of today's modern business environment. Utilizing current best practices and applicable standards across the key data center Infrastructures.

The Certified Data Center Design Professional (CDCDP®) program is proven to be an essential certification for individuals wishing to highlight their expertise and progress their career within the data center sector.

The program has a comprehensive agenda that explores and addresses the key elements associated with designing a data center. It teaches best practice principles for the design, construction and operation of computer rooms and data center facilities. The program also addresses the requirements of a successful design to meet the business needs, incorporating the key infrastructure elements of the physical infrastructure, electrical distribution systems, air-conditioning, data cabling and building support systems. It concludes with a comprehensive case study exercise that leads learners through the design steps from initiation to commission, covering the business decisions, design scope and implementation phases that need to be addressed throughout the design configuration process.

The CDCDP® also takes into account the requirements of the current BS EN 50600 and TIA 942-B standards, industry best practice documentation and codes of conduct.

During the program learners will also have access to current standards for reference purposes.

The program will prove beneficial for professionals already working and implementing design projects within a data center facility, or those looking to move into the data center environment from IT, network, data cabling or facilities management backgrounds.

The CDCDP® program content is continually updated to reflect the current data center industry design practices and supporting technology.

> "The CDCDP® program contains lots of useful information regarding US and International standards. Outstanding program and highly recommended."
>
> DATA CENTER MANAGER

Certified Data Center Design Professional (CDCDP®)

5 Day Program

Program Objectives
Learners gain a comprehensive insight into the essential elements of data center design and how to address them in a variety of situations and applications.

Learner Profile
The CDCDP® program is designed for individuals involved with, or responsible for, an existing data center, or those looking to achieve best practice when designing and implementing these facilities.

Pre-Requisites
Experience of working within a data center environment is essential; preferably with two years experience in a technical IT or facilities role. If you would like to discuss your experience or suitability for this program please contact us.

Program Duration
5 day class requiring pre-class study of approximately 20 hours.

Program Requirements
Learners are required to undertake pre-class study, which is fully supported by an experienced and dedicated online Tutor. Learners are also required to bring a webcam enabled laptop or suitable device with unrestricted wireless internet connectivity, the latest internet browser and suitable applications for reading/annotating PDFs and editing standard office documents.

Qualification
- Internationally and industry recognized BTEC Level 5 Professional Award Certified Data Center Design Professional

Certification
- Official Certified Data Center Design Professional (CDCDP®) certification
- Use of CDCDP post nominal title
- Use of the CDCDP® logo

Certifications are a commitment to life-long learning and offer the perfect portal to ensure knowledge, skills and certification remain current and up-to-date. Each certification gained requires re-certifying every three years via an online learning management system.

Additional Awards
- Continual Professional Development (CPDs)
- 7 IEEE Continual Education Units (CEUs)

Certified Data Center Design Professional (CDCDP®) Topics

Core Unit

What is a Data Center?
- The data center Stack
- Types of data center

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, height, floor loading, lighting and decor

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 stabilization
- 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 principles
- Hot and cold aisle containment
- Psychrometric charts
- Min and max throw distances for under floor air
- Bypass and recirculation
- Airflow management
- Chilled water racks, CO_2, free air cooling

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
- Seperation of power and data cables
- Administration and labeling
- 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 center equipment
- Functions and protocols, current and future
- Data center connections
- Cabling requirements
- Cabling standards
- Cabling options
- The impact of 40G and 100G
- The impact of virtualization

Copper and Optical Fiber Cabling Connectivity
- Cabling standards
- Cable categories supporting 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 fiber management
- Types of optical cable
- 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

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

Professional Unit

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

Power Regulations
- Which regulations affect data centers?
- 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 Center
- 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 Center
- 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 center limiting factors
- Sources of cooling inefficiencies
- Cooling trends

Regulatory Climate
- Which regulations affect data centers?
- 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

Collecting the Heat
- Cooling system overview
- CRACs and CRAHs
- Maximizing 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 improvement

Data Center 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)

Best Practices
- Effective v Efficient
- The DC language barrier
- The multi-functional team
- Design for efficiency, operability & flexibility
- Industry recognized best practices

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

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

Efficiency Models & Best Practices
- Energy calculations
- Levels of modeling
- Modeling tools
- Sources of guidance
- Effective v efficient
- The DC language barrier
- The multi-functional team
- Design for efficiency, operability & flexibility
- Industry recognized best practices

Design Management
- Characteristics of project management
- Key project processes
- Identifying and engaging with key stakeholders
- Setting goals
- Prioritization 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

There are a number of group discussions and individual design exercises throughout this program.