DESIGN

CDCDP®

Certified Data Center Design Professional

Pearson BTEC Level 5 Professional Award

5 Day Program

CNet Training

An Uptime Education Company

Global Leading Technical Education for the Digital Infrastructure Industry

Certified Data Center Design Professional (CDCDP®)

Create a comprehensive data center design that supports the critical needs of the business, examining in-depth the key constraints of data center functionality to deliver a balanced, efficient and sustainable solution.

Program Overview

The Certified Data Center Design Professional (CDCDP®) program is proven to be an essential certification for individuals wishing to demonstrate their technical knowledge of data center architecture and component operating conditions.

This five-day 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 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.

Learners will also explore the key elements of physical infrastructure, electrical distribution systems, air-conditioning, data cabling and building support systems. The program concludes 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.

A certified CDCDP® also considers the requirements for compliance, having a full understanding of national and international regulations, codes and standards. During the program, learners will be provided a valuable opportunity to access the latest industry standards.

The CDCDP® program is led by one of CNet's expert Instructors and is available via remote attendance or classroom-based.

Program Duration

5 days requiring pre-class study of approximately 20 hours.

Program Format

60% Theory, 40% Case Study.

Program Objectives

CDCDP® certified individuals will possess unrivaled knowledge, expertise and capability to deliver a comprehensive data center design to meet ongoing operational and business needs.

Learner Profile

The program will prove beneficial for professionals already designing projects for implementation within a data center facility, or those looking to advance into data center design from associated data center technical or operational roles.

Pre-requisites

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

Program Requirements

Learners are required to undertake pre-class study, which is fully supported by an experienced and dedicated online support team.

Learners are required to have:

- A webcam and microphone enabled laptop with unrestricted wireless internet connectivity and a pre-installed web browser
- A suitable application for reading/annotating PDFs and a suitable application for editing standard office documents such as Microsoft Word, PowerPoint, and Excel

Qualification

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

Certification

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

Certifications are a commitment to lifelong 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

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

Certified Data Center Design Professional (CDCDP®) Topics

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 and Syska Hennessy Critical Levels)
- Recommendations for location, size, height, floor loading, lighting and decor

White space 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 distributions 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
- Underfloor plenum approach
- Hot aisle/cold aisle layout principles
- Hot and cold aisle containment
- Psychrometric charts
- Min and max throw distances for underfloor air
- Bypass and recirculation
- Airflow management
- Chilled water racks, CO2, free air cooling

Earthing & Bonding
- Applicable standards
- The terminology of earthing, grounding and 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 labeling
- Types of conduit, trunking, tray, etc. available
- Earthing and bonding
- Containment fill ratio
- Underfloor vs 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 visualization

Copper & Optical Fiber Cabling Connectivity
- Cabling standards
- Cable categories supporting 10GBASE-T, CAT6A, Cat 7A and 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 & Manageability
- Local codes and regulations
- Fire safety plan
- ASD and detection systems
- Fire suppression systems
- Fire safety cable requirements
- Security and access control

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

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 and 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 vs 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

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 and 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 airside systems and waterside systems
- DCiE for cooling options
- Diagnostic and site specific monitoring
- Design considerations

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

Efficiency Models & Best Practices
- Energy calculations
- Levels of modeling
- Modeling tools
- Sources of guidance
- Effective vs Efficient
- The DC language barrier
- The multi-functional team
- Design for efficiency, operability and 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.