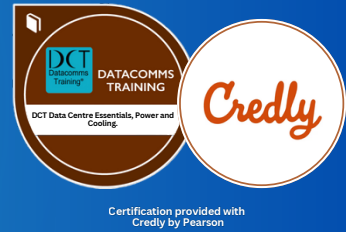


DCT DATA CENTER - ESSENTIALS, POWER & COOLING



The DCT Data Centre Combo course provides a clear understanding of data centre essentials, focusing on power and cooling systems that ensure reliable and efficient operations.

Duration: 5 Days

Course Code: DCT-DC-ECP

Essentials Overview:

Data centers play such significant roles in our business and personal lives, yet not many people really know what they are. Often referred to as “the cloud” where our data is stored and processed, they are much more than this; they power the internet giving us the ability to pay bills online, access our emails, obtain money from ATM machines, watch movies, communicate around the world and to carry on what is now considered a normal, fiercely technological lifestyle. This program has been designed to help de-mystify the complex world of data centers. It provides an overview of what data centers are, what they do and why we need them. Key aspects relating to basic design and design philosophies are also examined and the essential considerations of data center management such as operational processes, energy management and facility management are explored along with their relationships to overall business strategy.

Objectives:

- Different factors drive the need for a data center:
- Driving factors for a data center
- Data center standards
- Data center availability models and cons

Pre-requisite

- There are no specific pre-requisites for this program however some awareness of the data centre industry would be advantageous.

Target Audience

This program has been designed for individuals who are either new to the data centre sector (technicians with limited experience or exposure to data centre facilities) or for those who sell products and services to the data centre sector.

Course Outline

MANAGING A DATA CENTER

For a data center to be effective and efficient in its operations, management is key, consider:

- Regulations, best practices, and operational processes
- Change management processes -MAC's.
- Efficient & efficient energy management
- Commissioning & decommissioning processes
- Information Technology & physical security management

FACTORS ENHANCING DEPENDABILITY OF A DATA CENTER

- Ability to be relied upon
- Ability to be available as and when needed.
- Duplication of components
- Classification of data center - Tier levels

MAIN COMPONENTS OF DATA CENTER

- I.T components
- Power components
- Cooling components
- Auxiliary components – fire, security, BAS

DATA CENTER ACTIVE EQUIPMENTS SPACES

- Data center spaces
- Recommended Layouts
- Space cleaning
- Approach to commissioning

MANAGING DATA CENTER SUPPORTING SPACES

- Cooling system spaces
- Power system spaces
- Fire protection spaces
- Network infrastructure spaces
- General offices & security spaces

MANAGING DATA CENTER SECURITY, SAFETY, NETWORK & I.T

- Safety precaution measures
- Managing Security
- Managing Fire protection
- Managing network
- Managing I.T infrastructure

DCT DATA CENTER - ESSENTIALS, POWER & COOLING

The DCT Data Centre Combo course provides a clear understanding of data centre essentials, focusing on power and cooling systems that ensure reliable and efficient operations.



Duration: 5 Days

Course Code: DCT-DC-ECP

Power Overview:

The DCT Data Center Power course dives more deeply into the electrical and power systems and components that support data centers. With data centers using about 5% of the world's energy and growing, these power systems are ever-expanding and improving. The Course covers the many aspects of the most typical electrical systems and equipment for data centers, including terminology, standards, acronyms, operation, efficiency, and more.

Objectives:

- Introduction to data center electrical and power systems.
- Redundancy concepts for electrical distribution and equipment.
- Understanding of electrical equipment, systems, and controls
- How differing priorities and data center types change the electrical design

Target Audience

- Architects
- Engineering design professionals
- Facilities operations
- Contractors
- Technicians
- Electrical engineers, technicians, operators

Pre-requisite

- There are no specific pre-requisites for this program however some awareness of the data centre industry would be advantageous.

Course Outline (Includes DCT Essentials)

- Introduction to Data Center
- Data center Power Requirements
- Power units - VA, W and VAR - Power Triangle
- DC and AC systems power supply systems
- Power flow in Data Center and Mission Critical Systems
- Sizing of Data Center Power & Critical Systems
- Electrical Codes and Standards for Data Centers
- Power Topologies - single phase vs three phase & AC and DC Power Supply
- Sources of Electrical Power - Gensets, Utility, Solar, Nuclear etc
- Electrical Conductors, Cables, Cable trays and conduits
- Types of Cables and Conductors
- Sizing of Data Center cables and conductors
- Cables trays and cable trunkings
- Cable conduits - PVC and Metallic
- Power Protection Devices
- Circuit breakers, Fuses, Relays, Isolators, Switches sizing
- Voltage Regulation and Stabilization devices
- Line diagrams and electrical power layout drawings
- Lightning Arrestor
- Power Distribution
- Power Distribution in data center
- Switch room Switch gear and devices
- Distribution Panels and Boards
- Critical vs Raw power distribution standards
- Floor vs Overhead Power Distribution
- Rack Power Distribution - PDUs
- EPO Guidelines and Layout
- Transformers
- ATS and MBS systems
- Power factor correction systems & Surge Suppression systems
- PUE
- Data Center energy efficiency and power efficiency
- Measuring, Monitoring & Routine Checks
- Trends in Data Center Power Systems
- Standby Power Systems
- UPS systems

DCT DATA CENTER - ESSENTIALS, POWER & COOLING

The DCT Data Centre Combo course provides a clear understanding of data centre essentials, focusing on power and cooling systems that ensure reliable and efficient operations.



Duration: 2 Days

Course Code: DCT-DC-ECP

Power Overview:

The DCT Data Center Power course dives more deeply into the electrical and power systems and components that support data centers. With data centers using about 5% of the world's energy and growing, these power systems are ever-expanding and improving. The Course covers the many aspects of the most typical electrical systems and equipment for data centers, including terminology, standards, acronyms, operation, efficiency, and more.

Objectives:

- Introduction to data center electrical and power systems.
- Redundancy concepts for electrical distribution and equipment.
- Understanding of electrical equipment, systems, and controls
- How differing priorities and data center types change the electrical design

Target Audience

- Architects
- Engineering design professionals
- Facilities operations
- Contractors
- Technicians
- Electrical engineers, technicians, operators

Pre-requisite

- There are no specific pre-requisites for this program however some awareness of the data centre industry would be advantageous.

Course Outline (Includes DCT Essentials)

- Introduction to Data Center
- Data center Power Requirements
- Power units - VA, W and VAR - Power Triangle
- DC and AC systems power supply systems
- Power flow in Data Center and Mission Critical Systems
- Sizing of Data Center Power & Critical Systems
- Electrical Codes and Standards for Data Centers
- Power Topologies - single phase vs three phase & AC and DC Power Supply
- Sources of Electrical Power - Gensets, Utility, Solar, Nuclear etc
- Electrical Conductors, Cables, Cable trays and conduits
- Types of Cables and Conductors
- Sizing of Data Center cables and conductors
- Cables trays and cable trunkings
- Cable conduits - PVC and Metallic
- Power Protection Devices
- Circuit breakers, Fuses, Relays, Isolators, Switches sizing
- Voltage Regulation and Stabilization devices
- Line diagrams and electrical power layout drawings
- Lightning Arrestor
- Power Distribution
- Power Distribution in data center
- Switch room Switch gear and devices
- Distribution Panels and Boards
- Critical vs Raw power distribution standards
- Floor vs Overhead Power Distribution
- Rack Power Distribution - PDUs
- EPO Guidelines and Layout
- Transformers
- ATS and MBS systems
- Power factor correction systems & Surge Suppression systems
- PUE
- Data Center energy efficiency and power efficiency
- Measuring, Monitoring & Routine Checks
- Trends in Data Center Power Systems
- Standby Power Systems
- UPS systems

Course Outline (Power)

- UPS systems
 - What is a UPS system?
 - Types of UPS system
 - Sizing of UPS systems
 - UPS Components: Batteries , UPS Room, SNMP etc
 - UPS Configurations - Parallel and Eco Modes
 - Redundancy Systems and Topologies N, N+1, 2(N+1)
 - Generators
 - Generators room specifications
 - Fuel Management
 - Earthing, and Grounding Bonding
 - Lighting
- Operation and Maintenance of Power Equipments
 - Electrical system maintenance on the following - UPS, Batteries, PDUs, Transformers, Switchboards, Switchgears,
 - SNMP and IoT in DC Maintenance

DCT DATA CENTER - ESSENTIALS, POWER & COOLING



The DCT Data Centre Combo course provides a clear understanding of data centre essentials, focusing on power and cooling systems that ensure reliable and efficient operations.

Duration: 5 Days

Course Code: DCT-DC-ECP

Cooling Overview:

The DCT Data Center Cooling course, covers the mechanical cooling systems that support data centers and prevent them from overheating. As the data center power and density has increased every year, the need to remove the heat generated has become a more important factor for the design and operation of the facility.

Objectives:

- Introduction to data center cooling and mechanical systems.
- Redundancy concepts for mechanical and cooling systems.
- Understanding of mechanical & plumbing systems and control.
- How differing priorities, locations, and more change the cooling design.

Target Audience

- Architects
- Engineering design professionals Facilities operations
- Contractors
- Technicians
- Mechanical engineers

Pre-requisite

- Basic understanding of data centers, layouts, and common terms.

Course Outline (Includes DCT Essentials)

- Introduction: Concepts, definitions
- The need for cooling
- Heat Transfer
- Heat gains
- Temperature and humidity requirements
- Ventilation rates
- Air quality
- Cooling loads
- HVAC equipment
- Data center cooling systems
- Basics of how cooling systems work
- operating conditions - the typical mechanical terms, cooling operations, and redundancy levels
- Air cooling solutions - air cooling and operating parameters for typical datacenters
- Computational Fluid Dynamics - what it is, how these tools are used, and what to look for when analyzing a data center flow model
- Types of Datacenter cooling systems
- Air Cooling
- Direct Liquid Cooling
- Cooling Equipment types
- Direct Expansion Systemsrelationship

- Chiller based cooling
- Air management and control systems
- Raised Floor cooling
- Non-raised floor cooling
- Aisle containment
- Hot aisle
- Cold aisle
- Operating the data center cooling systems
- Reliability and Risk mitigation
- Recommendations and Best practices
- Measuring, monitoring, and routine checks
- HVAC efficiency and Power Usage Effectiveness (PUE) relationship