

DCT Data Center Combo

(DATA CENTER ESSENTIALS, DATA CENTER POWER & DATA CENTER COOLING)



1. Data Center Essentials

Program Duration:

1 Days

Program 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

Target Audience

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

Pre-requisites

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

Program Overview

Data centers, essential to modern life, are often misunderstood. They power the internet, enabling online payments, emails, global communication, and more. This program clarifies data centers' roles, covering their design, management, and strategic importance in business, including operations, energy, and facility management.

DCT Data Center Essentials Topics

a). Managing A Data Center

- Adherence to regulations, best practices, and operational processes
- Change management processes, including Moves, Adds, and Changes (MACs)
- Efficient energy management practices
- Commissioning and decommissioning processes
- Information Technology (IT) and physical security management

b). 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

c). Main Components of Data Center

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

d). Data Center Active Equipment's Spaces

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

e). Managing Data Center Supporting Spaces

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

f). Managing Data Center Security, Safety, Networking & IT

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

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2. Data Center Power

Program Duration:

2 Days

Program Objectives

- Introduction to data center electrical and power systems.
- Redundancy concepts for electrical distribution and equipment.
- Understanding electrical equipment, systems, and controls; adapting design based on data center priorities and types.

Target Audience

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

Pre-requisites

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

Program 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

Data Centre Power Course Outline (Include DCT Essentials)

1. Introduction to Data Center
2. Data center Power Requirements
3. Power units - VA, W and VAR - Power Triangle
4. DC and AC systems power supply systems
5. Power flow in Data Center and Mission Critical Systems
6. Sizing of Data Center Power & Critical Systems
7. Electrical Codes and Standards for Data Centers
8. Power Topologies - single phase vs three phase . & AC and DC Power Supply
9. Sources of Electrical Power - Gensets, Utility, Solar, Nuclear etc
10. Electrical Conductors, Cables, Cable trays and conduits
11. Types of Cables and Conductors
12. Sizing of Data Center cables and conductors
13. Cables trays and cable trucking's
14. Cable conduits - PVC and Metallic
15. Power Protection Devices
16. Circuit breakers, Fuses, Relays, Isolators, Switches sizing
17. Voltage Regulation and Stabilization devices
18. Line diagrams and electrical power layout drawings
19. Lightning Arrestor
20. Power Distribution
21. Power Distribution in data center
22. Switch room Switch gear and devices
23. Distribution Panels and Boards
24. Critical vs Raw power distribution standards
25. Floor vs Overhead Power Distribution
26. Rack Power Distribution - PDUs
27. EPO Guidelines and Layout
28. Transformers
29. ATS and MBS systems
30. Power factor correction systems & Surge Suppression systems
31. PUE
32. Data Center energy efficiency and power efficiency
33. Measuring, Monitoring & Routine Checks
34. Trends in Data Center Power Systems
35. Standby Power Systems
36. UPS systems
37. What is a UPS system?

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Data Centre Power Course Outline (Include DCT Essentials)

- 38. Types of UPS system
- 39. Sizing of UPS systems
- 40. UPS Components: Batteries , UPS Room, SNMP etc
- 41. UPS Configurations - Parallel and Eco Modes
- 42. Redundancy Systems and Topologies N, N+1, 2(N+1)
- 43. Generators
- 44. Generators room specifications
- 45. Fuel Management
- 46. Earthing, and Grounding Bonding
- 47. Lighting
- 48. Operation and Maintenance of Power Equipment's
- 49. Electrical system maintenance o
- 50. SNMP and IoT in DC Maintenance

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3. Data Center Cooling

Program Duration:

2 Days

Program 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-requisites

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

Program 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.

Data Centre Cooling Course Outline (Include DCT Essentials)

1. Introduction: Concepts, definitions
2. The need for cooling
3. Heat Transfer
4. Heat gains
5. Temperature and humidity requirements
6. Ventilation rates
7. Air quality
8. Cooling loads
9. HVAC equipment
10. Data center cooling systems
11. Basics of how cooling systems work
12. Operating conditions - the typical mechanical terms, cooling operations, and redundancy levels
13. Air cooling solutions - air cooling and operating parameters for typical datacenters
14. Computational Fluid Dynamics - what it is, how these tools are used, and what to look for when analyzing a data center flow model
15. Types of Datacenter cooling systems
16. Air Cooling
17. Direct Liquid Cooling
18. Cooling Equipment types
19. Direct Expansion Systems relationship
20. Chiller based cooling
21. Air management and control systems
22. Raised Floor cooling
23. Non-raised floor cooling
24. Aisle containment
25. Hot aisle
26. Cold aisle
27. Operating the data center cooling systems
28. Reliability and Risk mitigation
29. Recommendations and Best practices
30. Measuring, monitoring, and routine checks
31. HVAC efficiency and Power Usage Effectiveness (PUE) relationship