

# € TRAINING

Data Center Design and Operation



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## Introduction:

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

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.

## Course Objectives:

At the end of this course the participants will be able to:

- Setup a data center facility operations team
- Manage and motivate your facilities management team
- Setup SLAs and manage them including liabilities, KPIs, etc.
- Manage vendors and measure their performance
- Manage physical security taking into account requirements of standards such as ANSI/TIA-942 etc.
- Manage safety & statutory requirements
- Effectively and efficiently manage data center operations
- Manage documents
- Setup equipment life cycle including testing
- Define data center design limits and set-up and manage a proper capacity management plan
- Commission and decommission equipment
- IT cable management
- Manage the day-to-day data center operations

## Targeted Audience:

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

## Course Outlines:

### Unit 1:What is a Data Centre?

- The data center stack.
- Types of the 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, heights, floor loading, lighting, and decor.

## Unit 2: 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, 2N+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.

## Unit 3: 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 distance for underfloor air.
- Bypass and recirculation airflow management.
- Chilled water racks, CO2, free air cooling.

### Earthing & Bonding:

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

### Unit 4: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 v overhead containment.
- Cable management, in and to a rack.
- Fire stopping.

### Delivering the IT strategy:

- Datacenter equipment.
- Functions and protocols, current and future.
- Datacenter connections.
- Cabling requirements.
- Cabling standards.
- Cabling options.
- The impact of 40G and 100G.
- The impact of virtualization.

### Unit 5: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 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.