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دوره CDCS دیتا سنتر | Certified Data Centre Specialist

شرح مختصر

دوره سطح پیشرفته متخصصین دیتاسنتر

مروری بر دوره

مروری بر دوره

CDCS is the advance level for Data Centre Professionals and this ۳-day course will further increase attendees to a level being a compatible sparring partner with suppliers and they will be able to verify offers provided by vendors for correctness, effectiveness and efficiency.

آنچه در این دوره خواهید آموخت

آنچه خواهید آموخت

After completion of the course the participant will be able to:

- Understand the design life cycle of data centres and the stages involved
- Discuss the data centre requirements in great level of detail with vendors, suppliers and contractors to ensure that these requirements are met
- Validate design plans, quotes and oers proposed by vendors/contractors
- Understand redundancy levels for both the data centre design/setup and maintenance
- Understand the various building considerations such as bullet proofng,

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mitigation of seismic activity, fire ratings and thermal stability
- Understand how to install a raised floor that meets requirements, avoiding misalignment, level differences and leakage
- Understand how to read a Single Line Electrical Diagram to identify and avoid the most common design issues
- Choose the correct UPS and parallel configuration, learn and avoid classic parallel installation mistakes
- Understand how to calculate battery banks, validate offered configurations to ensure they meet requirements
- Understand what distance to keep to avoid EMF issues for human safety and equipment disturbances
- Understand the fundamental cooling setup, CFM, Delta-T and other important factors
- Understand contamination factors and limitations
- Understand full details of fire suppression options, how to calculate gas content and verify installations
- Understand how to measure data centre energy efficiency and how to improve it

سرفصل ها (حضوری)

سرفصل ها

Lesson ۱ - Data Centre Life Cycle

- Data center life cycle

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- Planning, continuous improvement and re-alignment

Lesson ۲ - Standards, Rating level Definitions and Requirements

- Rating level history
- ANSI/TIA-۹۴۲
- Uptime Institute"/ ANSI-TIA-۹۴۲
- High level overview of rating levels
- A few definitions; N+X
- 'N' Component redundancy levels
- N+I Implementations
- A few definitions; ۲N+X
- '۲N' redundancy options
- Concurrent Maintainability {CM)
- Compartmentalization
- Example Topologies
- Example: Rating level ۱ (power only)
- Example: Rating level ۲ (power only)
- Example: Rating level ۳ (power only)
- Example: Rating level ۴ (power only)
- Substation and feed requirements
- Which rating level to choose?
- New approaches to redundancy I Rating
- Redundancy level design do not take away all risks
- Maintenance
- Operational process
- Skills development

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Lesson ۳- Building Considerations

- Building location
- Building floor loading and conversion ratios
- Floor loading considerations
- Managing floor and hanging loads
- Data center fires
- Fire rated walls
- A few dangers
- Data center fire rated walls
- Fire rated glass
- Blast protection
- Blast impulse
- Bullet (ballistics) protection
- Bullet proofing standard (UL-۷۵۲)
- Forced entry protection
- Forced entry protection standards
- Forced entry protection

Lesson ۴ - Advanced Raised Floor/Suspended Ceiling

- Raised floor installation
- Starting point
- Setting up of the grid
- Installing the floor
- Pedestal an stringers, clip on
- Pedestal and stringers, bolted

- Raised floor problems
- Perforated and grill panels
- Floor plan setup for effective cooling
- Air conditioner area
- Seismic protected construction
- Testing and compliance
- Seismic mitigation, bracing
- Seismic racks
- Seismic mitigation, shock absorption
- Seismic mitigation; absorption platforms
- Best practices for seismic mitigation
- Suspended ceiling

Lesson ۵ - Power

- Some electrical basics single/three phase
- Watt/VA/Voltage/Current
- Formula for VA/WATT/PF
- Power infrastructure layout
- Basic Single line Diagram
- Single line Diagram
- Protection devices in power systems
- Over-current protection devices
- Some definitions
- Fuses
- Over current protection: MCB/MCCB/VCB/ACB
- VCB/ACB

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- Indicators on over current devices
- Breaking curve
- Breaking curves
- Fuses versus Breakers
- Residual current / Earth leakage protection
- Earth leakage protection
- Acceptable voltage levels
- Residual current device/breaker (rcd/rcb/gfci/alci)
- Working of RCB and key indicators
- Sizing of breaking components
- Proper configuration is key
- Surge protection
- Lightning strikes hit points and effects
- Origin of surge and transients
- Protection for surge: TVSS or SPD
- Technology used in surge protection
- Type of protection provided
- Standard mode surge protection
- Dedicated all-mode surge protection
- Cascading surge protection
- Cascading surge protection
- Proper installation practices SPD
- Power cabling
- Installation considerations
- POU/DB requirements
- Generators

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- Importance Of generators
- Standby/prime/continuous Generators
- High power Generator
- Principle of power generation via alternator
- Basic components on a standby Generators
- Combustion engine
- Alternator
- Governor
- Fuel Calculation
- Fuel tanks
- Parallel of generator sets

- Generator room/area requirement
- UPS systems
- Recap: name the three classes of UPS (IEC-۶۲۰۴۰)
- The VFI class UPS
- UPS in normal mode
- UPS running on batteries
- UPS Running on Static Bypass
- Ups running on maintenance Bypass
- Synchronization of output to input
- UPS Specification to look out
- Requirement for parallel Configuration
- Harmonic filters
- Harmonics

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- Harmonic filtering / reduction
- Passive harmonic filters
- Active harmonic filters
- Batteries
- Batteries for UPS systems
- Design battery banks
- Battery bank terminology
- A word to the wise
- Calculating battery banks – what info do you need?
- Battery calculation step by step
- Example battery calculation
- Selecting the battery
- Battery block selection
- Battery Calculation Exercise
- Example
- Calculating the charger
- Charging current requirement
- Charging via rectifier
- Charging via DCDC converter
- Parallel strings in battery banks
- The guideline for Parallel battery banks
- Battery bank configuration and replacement
- Battery testing
- Battery case selection
- Flywheel UPS/ Energy storage
- Flywheel energy storage

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- Hydrogen fuel storage
- Compressed Air UPS

Lesson ۶ – Electromagnetic Fields

- The two norms/standards to consider
- Source of EMF to consider around the data center
- Difference between single/three phase radiation
- How to measure EMF
- Safe distance guidance
- Distance reduce shielding material requirements
- How to calculate attenuation factor for shielding
- Permeability and saturation point

Lesson ۷ – Cooling

- Dry Bulb / Wet Bulb temperature
- Psychometric Chart ASHRAE ۲۰۱۱
- Relative Humidity / Dew Point
- Sensible/Latent Heat
- Temperature / Humidity Standards & Measurements & Airflow
- Cooling Standards/Guidelines ICT Equipment
- ASHRAE ۲۰۰۸ / ۲۰۱۱ Classes
- ASHRAE ۲۰۱۱
- Why the limits?
- Rate of Change

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- Temperature/Humidity Measurements
- Heat transfer (dissipation)
- Altitude based de-rating of temperature
- Equipment Airflow
- Airflow Pattern
- Floor plan setup for effective cooling
- Tile choice will impact performance
- ۲۵٪ Surface Opening Steel Tile
- ۲۰٪ Surface Opening Steel Tile
- ۳۵٪ Surface Opening Steel Tile
- ۴۵٪ Surface Opening Steel Tile
- ۵۵٪ Surface Opening Aluminum Tile
- Aluminum Grille Tile with Damper
- ۵۵٪ Surface Opening Aluminum Tile with Damper
- Ensure all holes and cable entries are sealed
- Rack Air Flow
- Mesh Door Racks
- Placement of equipment in rack
- Blanking/ Blind Panels
- Cable Management
- Delta-T for JCT equipment
- Optimizing airflow (room)
- Guiding hot air out of the room
- Ducting into the suspended ceiling
- Formulae & Calculations
- Conversion Celsius/Fahrenheit

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- Thermal Units Conversion
- Air volume displacement
- Some interesting notes
- Cooling capacity of Air (Fahrenheit)
- Cooling Capacity of Air (Celsius)
- Total capacity required, rule of thumb
- Air-Conditioning Selection
- Air Conditioning Unit Selection
- Air Conditioning Capacity
- Example
- Humidity Control
- Humidity Control Options; Humidifying
- Humidity Control Options
- Humidity Control Options; De-Humidifying
- Additional Considerations
- Air Conditioning Efficiency
- SHR- Sensible Heat Ratio
- SHR and the impact on OPEX
- Efficiency indicators for air conditioners
- "New" cooling principles and techniques
- Submerged cooling system
- VSD/VFD: Variable Speed/Frequency Drives
- EC- Fans
- VRF- Variable Refrigerant Flow
- Economiser
- Waterside Economiser

- Airside Economisers
- Air Conditioning Redundancy
- Air Conditioner Redundancy; Equipment Level
- Installation Requirements
- Air conditioner positioning
- Air conditioner area
- Service corridor installation consideration
- Air conditioner to fire panel link / EPO
- Commissioning of air conditioners
- Set point & calibration
- Proper settings of air conditioners
- CFO (Computational Fluid Dynamics)
- Room construction modeling
- Cabinet modeling
- Simulation run for racks
- Simulation runs on facilities
- Continuous maintenance is required

Lesson ۸- Fire Protection

- The fire triangle
- Recap of CDCP
- Detection System
- VESDA/HSSD
- Smoke sensor head installation
- Testing of smoke sensors
- Typical choices for fire suppression

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- Types of water based systems
- Issues with dry-pipe I pre-actin systems
- Examples of corrosion
- Sprinkler system
- Gas based systems, how to choose the right one
- Halocarbon & Inner systems
- Comparison
- How to choose a right Gas system
- Fire suppression calculation kg/m۳(FM۲۰۰)
- Example calculation
- Fire suppression Calculation lbs/ft۳ (FM۲۰۰)
- Inner gas Calculation
- Flooding factors (X) based at x٪
- Amount of Agent
- Example calculation Inert gas
- Example calculation for Inergen
- Example calculation Inert gas
- Example calculation cylinders
- Weight of the gas
- Example Ingergen Calculation (Metric)
- Example calculation for Inergen
- Example calculation Inert gas
- Example calculation cylinders
- Weight of the gas
- Safety considerations for calculations
- System discharge times and hold I retention times

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- Fire detection panel
- Pipe supports (hangers)
- Installation verification
- Ongoing maintenance
- Alternatives: Water mist
- Hypoxic based fire prevention
- Alternatives: Oxygen depriving systems

Lesson ۹- Designing and Installing Scalable Network Cabling Systems۴۱۳

- TIA-۹۴۲ network cable logical architecture
- TIA-۹۴۲ network cable I Rating levels illustration
- Cabling recommendation byTIA-۹۴۲ (۲۰۰۵)
- Cabling recommendation by TIA-۹۴۲-A {۲۰۱۲)
- Physical cabling layout- TOR (Top of Rack) design
- TOR design
- Physical cabling layout – EOR (End of Row) design
- EOR design
- Non-RJ۴۵ copper solutions
- Pre-terminated cabling
- Ready for future - MPO/pre-terminated fiber
- ۴۰G or ۱۰۰G networks
- High speed Ethernet
- Fiber storage (SAN}
- Intelligent patching
- Vendor documentation
- Installation best practices

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- Telecommunications cable routing
- Bending radius/pulling force (ANSI/TIA-۵۶۸-C)
- Data cabling separate from power
- Grounding and bounding standards
- Grounding and bounding for cabinets
- Cable fill calculator
- Fiber link loss calculator
- Administration/labeling
- Requirement for power cabling
- Labeling of UTP cables
- Labeling of Fiber cable
- Cabling administration standard: ANSI/TIA-۶۰۶B
- ANSI/TIA-۶۰۶b highlights
- Example of ANSI/TIA-۶۰۶B applications
- ANSI/TIA-۶۰۶B Examples
- Patch panel identifier example
- Grounding and bounding identifier example

Lesson ۱۰ - Environmental Specifications I Contamination Control

Definitions for noise
General thresholds for humans
Acoustical noise emissions
Effects of (excessive) noise ۴۶۴
Exposure limitations for data center
Acoustic avoidance and control
Contamination category

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Standard for gas and air particulate
Preventive measure for contaminate
Preventive measure during construction
Gasses: Common Causes
Gasses: Resulting Risk
Gasses: Contaminate measurement
Gasses: Preventive measure and cleanup
Solids: common Causes
Solids: Resulting Risk
IS۰-۱۴۶۴۴ classes
Solids: Contamination measurement
Solids: Preventive measures and cleanup
Solids: Preventive measures and cleanup
Usage of filters
Positive pressure
Raised floor

مخاطبان دوره

مخاطبان دوره

The primary audience for this course is an IT, Facilities or Data Centre Operations professional working in and around the data centre (representing both end-customers and/or service provider/facilitators) and having responsibility to achieve and improve hi-availability and manage ability of the Data Centre, such as: Data centre managers, Operations / Floor / Facility managers, data centre engineers, network/system engineers/data centre sales/consultants

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پیش نیاز ها

پیش نیازها

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