

## **Air Conditioning System Design for Critical Infrastructure (13 hours)**

This is an advanced learning section for mission-critical facilities design. It targets to engineers involved with design or applying HVAC (Heating, Ventilation, and Air Conditioning) equipment to critical infrastructure projects. It explores different factors, from **design, testing, commissioning, sustainability and efficiency**, of HVAC system for mission-critical purpose.

You will understand the design process and criteria for system selection. The various classifications of HVAC systems and associated distribution systems for mission critical facilities are explained. Each system type is evaluated based on the performance for energy efficiency, water use and comfort performance. You will be able to make informed decisions about the best choices of HVAC systems for mission critical applications and how system can best meet your **project goal** and **SLA (Service Level Agreement)**.

The class highlights the design principles such as psychrometric chart, load calculation / estimation, etc. and the design considerations such as air distribution, availability and redundancy, common mistakes, Computer Fluid Dynamic (CFD) model, integration with MEPs (Mechanical, Electrical and Water Plumb), etc.

<b>Day 1</b>	<b>Day 2</b>
<ol style="list-style-type: none"><li>1) Datacom Equipment Power Trends and Cooling Applications<ol style="list-style-type: none"><li>(a) load trends and their application</li><li>(b) air cooling of computer equipment</li><li>(c) liquid cooling of computer equipment</li></ol></li><li>2) Design Consideration<ol style="list-style-type: none"><li>(a) design criteria</li><li>(b) HVAC load</li><li>(c) computer room cooling</li><li>(d) air distribution</li><li>(e) liquid cooling</li><li>(f) availability and redundancy</li><li>(g) integration with other MEP system</li><li>(h) controls</li><li>(i) computer fluid dynamics</li></ol></li></ol>	<ol style="list-style-type: none"><li>3) Testing and Commissioning<ol style="list-style-type: none"><li>(a) air cleanliness test</li><li>(b) heat load test</li><li>(c) factory acceptance test</li><li>(d) site acceptance test</li><li>(e) integrated performance test (IST)</li></ol></li><li>4) Sustainable Design<ol style="list-style-type: none"><li>(a) combined heat power plant (CHP)</li><li>(b) solar cooling</li><li>(c) geothermal cooling</li><li>(d) evaporative cooling</li><li>(e) air side economizers</li><li>(f) desiccant unit</li></ol></li><li>5) Energy Efficiency<ol style="list-style-type: none"><li>(a) power usage effectiveness</li><li>(b) chilled water plant optimization</li><li>(c) water side and air side equipment</li><li>(d) part load operation</li><li>(e) controls and energy management</li><li>(f) LEED certified data center</li><li>(g) building energy code</li></ol></li></ol>

### **Remark**

The course is thoroughly conducted by vendor neutral Chartered Engineers (CEng) who have more than 15 years in Data Centre Design & Build and Critical Facilities' Operations.