

ASHRAE's HVAC Design Level I - Essentials: Tools for High Performance Building Designers

18-20 November 2019

The Beacon Hotel, Beacon Ct, Sandyford Business Park,
Sandyford, Dublin 18, D18 Y8N7, Ireland

ASHRAE Instructors:

Charlie Henck, P.E., Fellow/Life Member ASHRAE, CEM
George Pantelidis, Member ASHRAE

Instructors Supplemental Content:

Mr. Andrew Keegan, National Specifications Manager, Mitsubishi Electric Ireland
Mr. Steve Herbert, Controls & Training Manager, Forest Rock Ltd.

AGENDA

Monday, 18th November

8:15	Sign-in	12:30	Questions and Answers
9:00	Introductions	12:45	Lunch
9:15	Fundamentals <ul style="list-style-type: none">• Fan/Pump Laws• Refrigeration Cycle• U-Factor Calculations• Roofs and Windows	1:45	Psychrometrics
10:15	Load Calculation <ul style="list-style-type: none">• Manual Load Calculations<ul style="list-style-type: none">○ Human Comfort, Standard 55, Thermostat Set Points, Weather Data○ Heating Load	3:45	Break
10:30	Break	4:00	Psychrometrics (continued)
10:45	Load Calculation (continued) <ul style="list-style-type: none">○ Cooling Load○ Ventilation	4:45	System Selection <ul style="list-style-type: none">• Criteria for Selection<ul style="list-style-type: none">○ Zoning○ Over- / Under-Sizing○ Life Cycle Cost○ System
		Integration 5:45	Questions and Answers
		6:00	Wrap Up

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Tuesday 19th November

8:30 Sign-in

9:00 Design Process

10:00 **Basic Design of Air Systems**

- Building Pressurization
- Duct Design and Sizing
 - Leakage
 - Insulation
- Pressure Drop Calculations
- Diffuser Selection
- Fan Selection

10:30 Break

10:45 **Basic Design of Air Systems** (continued)

12:45 Questions & Answers

1:00 Lunch

2:00 **Basic Design of Air**

Systems (cont.)

2:30 Questions & Answers

2:45 **Basic Design of Hydronic Systems**

- Pump Selection
- Pipe Sizing
- Pump Configurations/Arrangements
- Piping Configurations/Arrangements
- Steam Design

3:45 Break

4:00 **HVAC Equipment**

- Air Moving Equipment
 - Fan Coil Units
 - Air Handling Units
 - Rooftop Units
- Cooling
 - Compressors
 - DX Condensing Units
 - Chillers
 - Heat Pumps (water/air cooled)
 - Cooling Towers (fluid/dry coolers)
- Heating
 - Boilers (non-condensing and condensing)
 - Indirect/Direct Gas Burners
 - Unit Heaters
 - Heating Coils (hot water/steam)
- Humidification
 - Electric
 - Gas
 - Steam-to-Steam

5:45 Questions and Answers

6:00 Wrap Up



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Wednesday 20th November

8:30	Sign-in	1:15	Overview BAS Controls
9:00	HVAC Systems <ul style="list-style-type: none">• Constant Volume Systems• VAV Systems• DOAS• Chilled Beams• Variable Refrigerant Flow• Underfloor Air Distribution• Chiller Plant Design• Boiler Plant Design• Water Source Heat Pumps• Ground Source Heat Pumps	2:15	Sponsor-Led Session: (Forest Rock) BAS Integration and Building Protocols
10:00	Break	3:00	Break
10:15	Sponsor-Led Session: (Mitsubishi Electric Ireland): Design Considerations for VRF Systems	3:15	Commissioning and Standard 180
11:15	Codes and Standards	4:15	Introduction to Technical Sales
12:00	Questions & Answers	4:45	Project Management <ul style="list-style-type: none">• Project Team• Project Scheduling• Documentation• Multi-Disciplinary Team
12:15	Lunch	5:30	Questions and Answers/Adjourn
		6:00	Adjourn



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