
1. Module details

Module name

HVAC HYDRONIC SYSTEMS

Nominal duration

One module
It is anticipated that students will achieve the competencies specified in 35 to 40 hours.

Module codes

EA133

Discipline code

2. Module purpose

To enable students to describe the fluid flow and distribution principles used in real Hydronic Systems and the skills to identify different system components, measure component performance including chillers, builders and flow control devices.

3. Prerequisites

NR014 - Air Conditioning Systems
NR015 - Air Conditioning Controls
EA146 - Introduction to Air Conditioning

4. Relationship to competency standards

TBA

5. Content

1. Systems Operation
 - closed/open systems
 - pump head/lift, static head (high rise building)
 - system friction losses
 - nett positive suction head
 - system curves
2. Pumps
 - types
 - selection criteria
 - performance characteristics
 - bladder tanks
 - coil characteristics
 - heat exchangers: plate, shell and tube, tube in tube
 - flow measurements: types
 - flow switchers
 - builders: types and performance characteristics
 - cooling towers: elementary cooling thermodynamics and types
3. Valves - flow control devices
 - types and applications
 - throttling characteristics
 - flow measurements
 - selection and applications

6. Learning outcome details

Learning outcome 1

4. Piping systems
- balancing and commissioning
 - air venting
 - water treatment
 - vacuum breaking and air breaks

On the completion of this module, the learner will be able to:

Identify and describe the different hydronic systems and their operation from actual installations and/or mechanical service drawings.

Assessment criteria

Short answer questions.

1.1 Differentiate between open and closed systems.

1.2 Define relevant terms.

1.3 Determine performance data from system curves.

Learning outcome 2

Identify the operating characteristics of the different pumps used in HVAC Hydronic Systems and determine system and pump performance data using manufacturer specifications.

Assessment criteria

2.1 Identify the different types of pumps and explain the operating characteristics of each.

2.2 Perform pump tests.

2.3 Correctly determine pump performance from operating data and specifications.

Learning outcome 3

Explain the function and application criteria for hydronic componentry used in HVAC Systems including chillers, boilers.

Assessment criteria

Assignment/practical tests

- 3.1 For water chilling plants, boilers, cooling towers
- list the different types
 - describe their operating characteristics
 - determine their performance characteristics

Learning outcome 4

Identify and explain the operation of flow control devices.

Assessment criteria

Short answer test.

4.1 Describe the various types of valves used in hydronic systems.

4.2 Determine throttling characteristics from specifications.

Learning outcome 5	List and describe the operating of different hydronic piping systems.
Assessment criteria	<p>Short answer questions.</p> <p>5.1 Describe the operation of 4 different piping systems used in HVAC installation.</p> <p>5.2 Identify any of these above from given piping drawings and/or specifications.</p>
7. Assessment Strategies	See Assessment Criteria.
8. Module Delivery Strategies	
9. Resource Requirements	<p>AIR DA16.</p> <p>ASHARE Handbooks - Fundamentals and Systems.</p> <p>Australian Pump Technical Handbook, Australian Pump Manufacturer's Association.</p> <p>Carrier Air Conditioning Design Handbook McGraw Hill.</p> <p>HVAC Systems Testing Adjusting and Balancing, SMACNA 1988.</p> <p>Kimoki - Applied Fluid Mechanics.</p> <p>Pipe Friction Handbook, Australian Pump Manufacturer's Association</p> <p>Trane Air Conditioning Manual: The Trane Company 1886.</p>