

1. Module details

Module name

APPLIED PSYCHROMETRICS

Nominal duration

One module

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

Module codes

EA135

Discipline code

2. Module purpose

To enable students to accurately plot typical HVAC Psychrometric processes on a psychrometric chart and to evaluate the changing thermodynamic properties of the air.

3. Prerequisites

EA131 - HVAC Air Systems

EA146 - Introduction to Air Conditioning

EA002 - Engineering Maths A

4. Relationship to competency standards

TBA

5. Content

1. Fundamentals & Terms

- sensible heat factor (conditioned space and grand total)
- quantity of air
- effective surface temperature
- bypass factor

2. Coil characteristics

- processes
 - sensible cooling
 - cooling, dehumidification
 - sensible heating

3. Spray processes

- saturation efficiency
- processes
 - adiabatic/evaporative cooling
 - cooling & humidification
 - sensible cooling
 - cooling and/or humidification
 - chemical dehumidification process:
dehumidification & heating
 - cooling tower characteristics: humidification & cooling
 - indirect evaporative cooling process

- 4. System analysis
 - partial load
 - reheat control
 - bypass control
 - volume control
 - dump back systems
 - low velocity coils
- 5. Psychrometric formulae and charts
 - properties of air
 - gas constants
 - derivation of air constants
 - combined gas laws
 - Dalton's law of partial pressures
 - Carrier's equation
 - psychrometric property tables
 - air mixing equations
 - air quantity equations

6. Learning outcome details

Learning outcome 1

Assessment criteria

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

Describe all the psychrometric terms, processes and factors used in the application of a psychrometric chart.

Short answer questions/practical test.

1.1 Describe the terms SHF, RSH, GTH.

1.2 List and describe all the properties of air found on the psychrometric chart.

1.3 Plot typical HVAC processes on a psychrometric chart.

Learning outcome 2

Assessment criteria

Calculate the psychrometric performance of an air conditioning coil.

Practical test/assignment.

2.1 Plot the psychrometric process of a given operating HVAC coil.

2.2 Calculate the psychrometric performance of the coil.

Learning outcome 3

Assessment criteria

Calculate the psychrometric performance of HVAC spray equipment.

Practical test assignment.

3.1 Plot the given spray process on a psychrometric chart.

3.2 Calculate the psychrometric performance of the spray process.

Learning outcome 4	Determine the psychrometric performance of a HVAC system in operation including partial load control.
Assessment criteria	<p>Practical test.</p> <p>4.1 Determine the operating performance of an air conditioning system from a psychrometric chart.</p> <p>4.2 Calculate the performance for partial load conditions.</p>
7. Assessment Strategies	See Assessment Criteria.
8. Module Delivery Strategies	
9. Resource Requirements	<p>ASHARE Handbooks, HVAC applications, Fundamentals</p> <p>Carrier System Design Manual, SI Metric Part 1.</p> <p>Jones, Air Conditioning Engineering</p> <p>Trane Air Conditioning Manual, Trane Publications.</p>