

1. Module details

Module name

INTRODUCTION TO AIR CONDITIONING

Nominal duration

One module

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

Module codes

EA146

Discipline code

2. Module purpose

This module aims to provide the student with basic knowledge of the principles of air conditioning and the way these principles are currently applied to the HVAC Industry.

3. Prerequisites

Nil.

4. Relationship to competency standards

TBA

5. Content

1. Occupational health requirements:

- WH&S requirements
- BCA requirements
- AS1668 parts 1 & 2
- AS3666
- noise and vibration
- air quality
- sick building syndrome

2. Operating requirements:

- ventilation
- air distribution
- terminal velocity
- temperature
- relative humidity
- air quality
- noise
- basic psychrometrics

3. Operating modes

- ventilation
- evaporative cooling
- ventilation and cooling
- ventilation and heating
- dehumidification
- dehumidification
- dehumidification and reheat
- humidification

-
4. Operating terminology/characteristics:
 - throw, drop
 - primary and secondary air
 - coanda effect
 5. HVAC system components and functions:
 - fans
 - ducting
 - registers
 - dampers
 - filters
 - cooling coils
 - heating coils
 - induction units
 - fan coil units
 - terminal units
 - humidifiers, pumps and sprayers
 - hydronic systems and components
 6. Applications and construction of air conditioning systems:
 - applications
 - residential, commercial, low and high rise, industrial ventilation and air conditioning
 - packaged plant
 - RACs, split systems (wall and floor consolem, ceiling fan coil), wall facia, roof top, reverse cycle option central station plant
 - all air systems, constant volume variable temperature, constant temperature variable volume, air/water systems
 - all water system, multi-zoning, thermal storage systems
 - basic air conditioning system diagrams
 - duct layout
 - hydronic layout
 - unit/conditioner drawings
 7. HVAC control systems:
 - basic principles
 - terminology
 - symbols and diagrams
 - basic applications

6. Learning outcome details

Learning outcome 1

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

List and detail the specific occupational health requirements associated with HVAC systems.

Assessment criteria	<p>Short answer test. Assignment.</p> <p>1.1 List all relevant sections of standards, codes and regulations that relate to the safe design, construction, operation and maintenance of HVAC systems.</p>
Learning outcome 2	<p>Detail the desirable operating requirements of HVAC systems.</p>
Assessment criteria	<p>Short answer test. Assignments.</p> <p>2.1 List and describe the desirable operating requirements of HVAC systems for a variety of applications representative of those found across the industry to ensure occupant comfort and safety.</p>
Learning outcome 3	<p>List and describe HVAC system components and the functions served by each.</p>
Assessment criteria	<p>Short answer test. Assignments.</p> <p>3.1 Identify air conditioning system components.</p> <p>3.2 Describe the functions served by each system component.</p> <p>3.3 Describe the operating concepts of air conditioning system components.</p>
Learning outcome 4	<p>List and describe the construction and applications of a representative range of HVAC systems as found in industry.</p>
Assessment criteria	<p>Short answer test. Assignment.</p> <p>4.1 List the full range of HVAC system applications.</p> <p>4.2 For each application, describe the system types that are suited.</p> <p>4.3 Describe the construction of packaged, central station, chilled water, thermal storage, and evaporative air conditioning systems.</p>
Learning outcome 5	<p>Describe the full range of operating modes of various HVAC systems quoting typical examples of the application of each.</p>

Assessment criteria	<p>Short answer test. Assignments.</p> <p>5.1 Explain the application of various principles/concepts to system operation and performance.</p>
Learning outcome 6	<p>Read, interpret and explain the sequence of operation of simple HVAC system diagrams.</p>
Assessment criteria	<p>Short answer test. Assignments.</p> <p>6.1 Explain the sequence of operation of a simple air conditioning system diagram.</p> <p>6.2 Draw a system diagram for simple air conditioning system.</p>
Learning outcome 7	<p>Read, interpret and explain the sequence of operation of simple HVAC control system diagrams.</p>
Assessment criteria	<p>Short answer test. Assignments.</p> <p>7.1 Explain the sequence of operation of a simple air conditioning control system diagram.</p> <p>7.2 Draw a control system diagram for simple air conditioning system.</p>
7. Assessment Strategies	<p>See Assessment Criteria.</p>
8. Module Delivery Strategies	<p>This module contains learning outcomes that will require both theory and practical instruction. As such, it will require resources to facilitate both on and off-the-job delivery strategies.</p> <p>These strategies may involve:</p> <ul style="list-style-type: none"> - co-operative registered off-the-job provider/employer delivery sharing available resources. - delivery by an employer who is subregistered as an off-the-job provider, with qualified trainers in-house using resources to facilitate on and off-the-job delivery. - off-the-job objectives should focus on the industry context while on-the-job objectives should reflect application within enterprise operations. <p>Assessment instruments will need to be developed by the module provider. These instruments will need to reflect consistency with stated module learning outcomes and related assessment criteria.</p>

9. Resource Requirements

Student records will be the responsibility of the off-the-job provider and where more than one off-the-job provider is involved, formal processes for transfer of student information must be established.

AIRAH Application Manual DA1

AIRAH 1989. AIRAH Handbook.

ASHRAE. ASHRAE Handbook, Fundamentals. Atlanta.

ASHRAE. ASHRAE Handbook, HVAC Systems. Atlanta

AUBRCC 1990. Building Code of Australia. CSIRO. North Ryde.

Boyle. Australian Refrigeration and Air Conditioning. Trust Publications.

Carrier Air Conditioning Company. Handbook of Air Conditioning Design, McGraw - Hill.

SMACNA 1987. HVAC Systems Applications.

Standards Australia - Latest Editions to be used:

AS1668 parts 1 & 2. The use of Mechanical Ventilation and Air Conditioning in Buildings.

AS1682 parts 1 & 2. Fire Dampers.

AS3666. Air Handling and Water Systems of Buildings - Microbial Control.

ASHB40. The Australian Refrigeration and Air Conditioning Code of Good Practice.

Stoecker W.F., Jones J.W., 1982. Refrigeration and Air Conditioning McGraw - Hill.

The Trane Company 1986. Trane Air Conditioning Manual.

Additionally, further information may be sourced from:

- journal articles
- literature from water treatment companies
- literature from hydronic system specialist companies