

1. Module details

Module name

INTRODUCTION TO REFRIGERATION

Nominal duration

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

Module codes

EA145

Discipline code

2. Module purpose

To provide the student with the knowledge and skills necessary to define the operation of the vapour compression refrigeration system and its major components. The student should also be able to describe the applications of such systems to commercial and industrial applications and the typical range of system components and enclosures/cabinets used in each application.

3. Prerequisites

EA002 - Engineering Maths A

4. Relationship to competency standards

TBA

5. Content

1. Major components, type and functions:
 - evaporators
 - compressors
 - expansion devices
 - ancillary components
 - refrigerants
2. System operation and performance:
 - thermodynamic properties of refrigerants
 - pressure enthalpy charts
 - the refrigerant cycle
 - the refrigerant cycle represented on pH charts
 - introduction to refrigerating effect, heat of compression, heat rejected on high side, co-efficient of performance, liquid sub-cooling suction superheating
 - effects on performance of changing operating pressures, liquid sub-cooling, suction superheating
3. Application of refrigeration:
 - introduction to industrial refrigeration, specific system component types and refrigerants applied.
 - scope of commercial refrigeration, specific system component types and refrigerants applied

- 4. Refrigerated enclosures and cabinets:
 - merchandising and display cabinets:
 - deep freeze meat
 - dairy
 - fruit and vegetable
 - multi-deck display
 - single deck
 - well type
 - island cases
 - glass door
 - reach door
 - reach in merchandisers
 - defrosting methods
 - cold rooms and freezer rooms
 - types and construction
 - insulation
 - vapour barrier
 - frost heave
 - interior fittings
 - location of equipment
 - defrosting methods
 - cold tracking
 - trace heating
 - storage conditions
 - temperature
 - relative humidity
 - air velocity
 - air patterns
 - load limits

- 5. Air conditioning chills & DX coils:
 - types and construction

6. Learning outcome details

Learning outcome 1

Assessment criteria

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

Explain the operation of typical vapour compression refrigeration systems and be able to quantify and compare performance of such systems.

Short answer test.
Assignments.

- 1.1 List the thermodynamic properties of refrigerants, stating all appropriate units.
- 1.2 Identify the representation of the thermodynamic properties of refrigerants on a pressure enthalpy chart.
- 1.3 Plot the refrigerant cycle of typical single stage commercial and industrial systems on pH charts showing typical liquid sub-cooling, suction superheating and pressure drop in system components.

	<p>1.4 Calculate appropriate changes in thermodynamic properties of refrigerants in order to quantify system performance.</p> <p>1.5 Determine effects on system performance brought about by varying system operating pressures and temperatures.</p>
Learning outcome 2	List and describe the major vapour compression refrigeration system components as used in typical commercial and industrial refrigeration applications.
Assessment criteria	<p>Short answer test. Assignments.</p> <p>2.1 List the types, and describe the construction of major system components.</p> <p>2.2 State the typical types of system components employed in a range of commercial and industrial refrigeration applications.</p>
Learning outcome 3	List and describe the range of refrigerated cabinets, cases, cold rooms and freezer rooms as used in typical commercial and industrial applications.
Assessment criteria	<p>Short answer test. Assignments.</p> <p>3.1 List and describe the construction, correct operation and maintenance requirements of merchandising and display cabinets.</p> <p>3.2 List and describe the construction, correct operation and maintenance requirements of cool rooms and freezer rooms.</p>
7. Assessment Strategies	See Assessment Criteria.
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.

9. Resource Requirements

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.

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.

Actrol Parts Catalogue & Technical Manual.

AIRAH 1989. AIRAH Handbook.

ASHRAE. ASHRAE Handbook, Fundamentals, Atlanta.

ASHRAE, ASHRAE Handbook, Refrigeration Systems and Applications SI Version. Atlanta.

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

Boyle. Australian Refrigeration and Air Conditioning. Trust Publications.

Dossat R.J. Principles of Refrigeration. SI Edition. McGraw - Hill.

Lovelock Luke Refrigeration Catalogue. Standards Australia - Latest Editions to be use:

AS 1677 Refrigeration Systems.

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