Advanced Certificate in Refrigeration and Air conditioning

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Advanced Certificate in Refrigeration and Air conditioning.

TVET PROGRAMME

Purpose

The purpose of this award is to enable the learner to attain standards required to achieve the Advanced Certificate in Refrigeration and Air conditioning, through the knowledge, skill and attitudes essential in all refrigeration, air conditioning and ventilation installation, diagnostics, maintenance, commissioning and repair in accordance to the national standards.

This qualification enables a competent learner at NQF Level 4, under general supervision, to demonstrate a basic ability to install, service, repair and operate mechanical equipment that is used in the refrigeration, air conditioning and ventilation industry.

Introduction

The Advanced Certificate in Refrigeration and Air conditioning is a two-year (2400hours) training programme offered full-time to secondary five (S5) school leavers and learners from School of

Advanced Level (SALs) as well as from another professional centres. This is equivalent to four (4) semesters. Two semesters represents one academic year. The same programme is also offered on part-time to learners already in employment over 6 semesters. Learners on the part-time come to SIT for lectures 1 1/2 days per week.

A learner on full time may exit after year and qualify for the Certificate after successfully completing all the units from semesters one and two and accumulated 120 credits.

A refrigeration and air conditioning engineer works on commercial, residential, public and industrial projects, including transportation and storage .

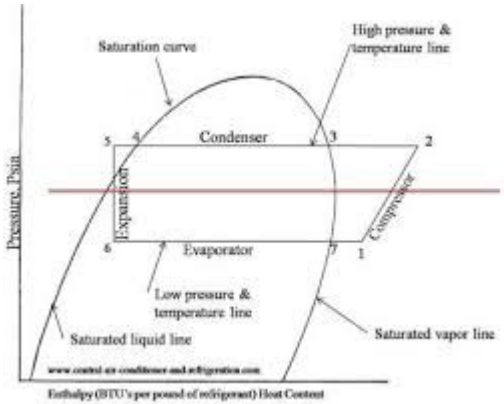
The refrigeration and air conditioning engineer generally works inside domestic, commercial or public buildings during and after construction and production, and on projects of all sizes and types. He or she will plan and design, install, test, commission, report, maintain, fault find and repair systems to a high standard. Work organization and self-management, communication and interpersonal skills, problem solving, flexibility and a deep body of knowledge are the universal attributes of the outstanding practitioner.

Industrial refrigeration mechanics is very much in demand in Seychelles. Large cold stores and freezers in the fishing industry require specialist with experience to service and maintain operations of the different refrigeration systems.

Progression and Further Studies

Graduates on the Advanced Certificate in Refrigeration and Air conditioning can apply for the National Diploma in Mechanical Engineering followed by the Advanced Diploma in Mechanical Engineering.

Graduates with a National Diploma in Mechanical Engineering can be accepted in different universities for a degree study in Mechanical Engineering with specialisation such as Plant Maintenance, Manufacturing, Mechatronics etc.



Pass mark for every unit on the programme is 55%.

As per SIT Assessment Policy, the final mark for a unit is made up of 40% of all continuous assessments plus 60% from the results of the final unit assessment (s) and the following grades and corresponding marks are used

Not yet Competent-NYC-0—54%
Pass - **P** -55%-69%
Credit or Merit - **M** or **C**- 70% - 84%
Distinction - **D** - 85%+

Career Opportunities in the Refrigeration and Air conditioning Industry

Refrigeration and Air conditioning mechanics are employed to install, service and repair refrigeration and air conditioning equipment. The refrigeration and air conditioning mechanics can also work as maintenance personnel on mechanical ventilation systems. They install and perform work the different components on these systems including, cleaning of duct work for air distribution.

Job prospect for those entering this industry are projected to be excellent. The building and construction industry engage refrigeration and air conditioning mechanics in the construction of buildings and other structures, alterations, additions, reconstruction, installation and maintenance and repairs of buildings and other structures.

Refrigeration and air conditioning is closely associated with other parts of the construction and transportation industries at all stages, and is equally affected by rapid change in these sectors, including growing environmental trends and requirements.

Entry Criteria

Learners wishing to apply for the Advanced Certificate in Refrigeration and Air Conditioning must have attained a minimum grade of "**G**" from the **IGCSE exam** in English, Mathematics and Combined Science or preferably Physics.

Applicants from another professional centre may be accepted exiting with a Certificate from that Institution.

Learners credited with this qualification will be able to:

⇒ Understand the basic operation of , refrigeration , air conditioning and ventilation systems.
⇒ Demonstrate an in-depth knowledge of the installation, commissioning and maintenance procedures used in the trade of refrigeration and air conditioning.
⇒ Demonstrate comprehensive range of specialised refrigeration and air conditioning skills using all commonly used refrigeration hand and power tools in compliance with all relevant health and safety legislation and best practice.
⇒ Exercise appropriate judgement in planning, diagnostics and delivering all services, installations and maintenance processes relating to refrigeration, air conditioning and ventilation

- ⇒ Transfer and apply theoretical understanding and technical know-how to inspect, diagnose faults, maintain and repair electrical and mechanical malfunctions and bring back to normal operation systems in a wide variety of domestic, commercial and industrial applications.
- ⇒ Exercise substantial independence in the workplace, taking responsibility for Refrigeration and Air conditioning duties performed by others and interacting with a variety of individuals and groups to include customers, colleagues and suppliers.
- ⇒ Determine the function and role of a Refrigeration and Air conditioning Mechanics in society to include an awareness of energy conservation and other ecological concerns.
- ⇒ Identify and work with component parts for refrigeration, air conditioning and ventilation equipment.
- ⇒ Work safely and responsibly in the plant environment.

Certification

To be awarded certificate in Advanced Certificate in Refrigeration and Air conditioning, the learner must have achieved the expected performance criteria set out in the different elements of each unit that make up the programme. The total credit requirement for this Advanced Certificate is 240 Credits .

This qualification is a level 4 on the National Qualification Framework (NQF).

Assessment Technique (s) including weighting (s)

The Advanced Craft Certificate grade is based on a weighted average of all unit result grades. Assessment approach varies from one unit to another. During every unit of study there is a minimum number of continuous assessments which the learner must undertake. This could be in the form of small tests and assignments and research. For the final unit assessments, in most cases a learner will have to sit for both a theory paper which can be multiple choice, structured or a mixture and a practical for skills demonstration.

Work based experience (WBE) is a compulsory unit and is assessed by the supervisor in the work place for full-time learners and through compilation of a portfolio and assessed against the performance criteria for the different elements in the WBE unit for learner on part-time.

To attain the required standard, a minimum of a pass grade must be achieved in all assessments prescribed .

Learners completing year one may exit with and qualify with a certificate in refrigeration and Air conditioning if he/she has passed all the units of semesters one and two.

Structure of the Programme for:

Semester 1	Semester 2	Semester 3	Semester 4
Health, Safety and Security Procedures (**30/15**)	Electrical Motors **(30/30)**	Gas and metal Arc Welding (**50/25**)	Electrical Motors **(20/10)**
Refrigeration and Air conditioning Mechanics **(20/10)**	Circuit Diagrams of Refrigeration Systems **(20/20)**	Ventilating and Air conditioning (1) (**40/20**)	Ventilating and Air conditioning (2) (**40/20**)
Engineering Tools, Instrument and Materials **(30/15)**	Room Split Air conditioners **(40/40)**	Refrigeration Systems and Applications (**20/10**)	Circuit Diagrams of Refrigeration Systems (**20/20**)
Fundamentals of Refrigeration **(20/10)**	Troubleshooting and Servicing **(60/30)**	Refrigeration Cycles and Components (**20/10**)	Troubleshooting and Servicing **(60/30)**
Domestic Refrigeration Appliances **(40/20)**	Accessories, Auxiliaries and Controls **(40/20)**	Accessories, Auxiliaries and Controls **(30/30)**	Automobile Air conditioning (**20/20**)
Refrigerants and Lubricants **(20/10)**		Refrigerants and Lubricants **(20/10)**	Installation and Insulation of Pipes and Ducts (**20/10**)
Electricity 1 **(30/30)**		Electricity 2 (**30/30**)	Refrigeration Plant Maintenance (**20/10**)
English (**20/10**)	Information and Communication Technology (ICT) (**20/10**)		
Mathematics 1 **(20/10)**		Mathematics 2 **(30/15)**	
Technical Drawing 1 **(20/10)**	Technical Drawing 2 **(20/10)**	Technical Drawing 2 **(20/10)**	Technical Drawing 2 **(20/10)**
Work Based Experience (W.B.E rotation 1) **(210)**	Work Based Experience (W.B.E rotation 2) **(210)**	Work Based Experience (W.B.E rotation 3) **(210)**	Work Based Experience (W.B.E rotation 4) **(280)**
Semester one: 250/140 (390) Notional Hours (250+140+210) = **600**	**Semester two:** 230/160 (390) Notional Hours (230+160+210) = **600**	**Semester three:** 240/150 (390) Notional Hours (240+150+210) = **600**	**Semester three:** 200/120 (320) Notional Hours (200+120+280) = **600**
Total number of hours for the year 1 of program: 1200		**Total number of hours for year 2 : 1200**	

Books and References for Study

A number of publications are available for the study and training in the Advanced Certificate in Refrigeration and Air conditioning. They are books which are regularly updated with new editions. Learners are advised to identify the latest editions.

The following are available in the SIT library and can be borrowed for study and reference:

Modern Refrigeration and Air conditioning-Athouse, Turnquist and Bracciano

Principles of Refrigeration and Air conditioning - RoyJ.Dossat and Thomas J.Horan

A textbook of Refrigeration and Air conditioning -Er.R.K Rajput

Electricity for Refrigeration , Heating and Air conditioning - Russell. E Smith

Refrigeration and Air conditioning - G.F Hundy, A.R. Trott and T.C Welch.

Journals and Articles on Refrigeration and Air conditioning can be accessed on-line via the internet using google. Computers with Internet access are available for research are also available in the SIT Library. The following website address can be useful:

https://www.ashrae.org/resources--publications/periodicals/ashrae-journal

https://www.journals.elsevier.com/international-journal-of-refrigeration

http://www.edmgr.com/IJACR

List of Statements of Competencies for Advanced Certificate in Refrigeration and Air conditioning

Statement of Competencies	Unit title	Semester (s) involved	Number of Credits
Apply health, safety and security procedures in the context of Refrigeration and Air conditioning	Health ,Safety and Security Procedures	1	**4.5**
Demonstrate knowledge of the occupation of a Refrigeration and Air conditioning Mechanic in the context of Seychelles	Refrigeration and Air conditioning Mechanics	1	**3.0**
Apply principles and practice using, maintaining and storing Engineering Tools, Instruments and pipework Materials	Engineering Tools, Instrument and Materials	1	**4.5**
Demonstrate knowledge of the fundamentals of Refrigeration	Fundamentals of Refrigeration	1	**3.0**
Use oral and written English in the context of refrigeration and air conditioning	English	1	**3.0**
Demonstrate knowledge of and practice on Refrigeration Systems and Applications	Refrigeration Systems and Applications	1, 3	**10.0**
Apply principles and practice of electricity	Electricity	1, 3	**10.0**
Apply knowledge, and practice handling Refrigerants and Lubricants in refrigeration and air conditioning systems	Refrigerants and Lubricants	1,3	**6.0**
Demonstrate knowledge of mathematics principles	Mathematics	1, 3	**7.5**
Use Information and Communication Technology skills (ICT) in the context of Refrigeration and Air conditioning	Information and Communication Technology (ICT)	2	**3.0**

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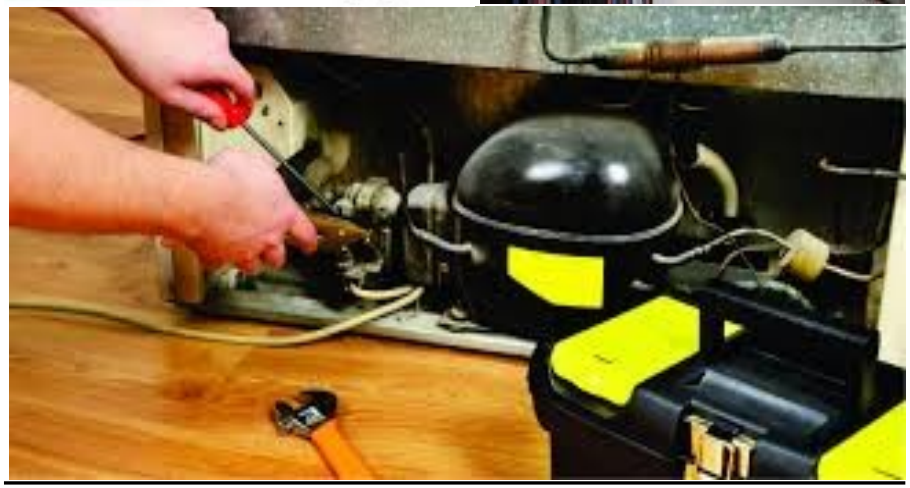

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Demonstrate knowledge and practice installing, and commissioning room split-type air conditioners	Room Split Air conditioners	2	**8.0**
Demonstrate knowledge and practice installing , fixing and storing accessories, auxiliaries and controls on refrigeration and air conditioning systems	Accessories, Auxiliaries and Controls	2,3	**10.0**
Demonstrate knowledge of, and practice on electric motors in Refrigeration and Air conditioning.	Electrical Motors	2,4	**9.0**
Demonstrate knowledge and practice of Circuit Diagrams in refrigeration and air conditioning	Circuit Diagrams	2,4	**8.0**
Demonstrate knowledge and practice in troubleshooting and servicing refrigeration and air conditioning systems	Troubleshooting and Servicing	2, 4	**15.0**
Demonstrate practice setting up and operating manual metal arc and gas welding equipments in given situations.	Manual Metal Arc and Gas Welding (MMAGW)	3	**7.5**
Demonstrate knowledge and practice on ventilating and air conditioning systems	Ventilating and Air conditioning	3,4	**12.0**
Demonstrate knowledge of the different refrigeration cycles and their major associated components	Refrigeration Cycles and Components	3, 4	**3.0**
Apply knowledge and practice of automobile air conditioning	Automobile Air conditioning	4	**4.0**

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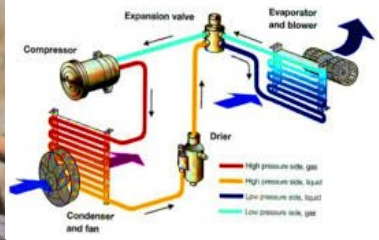
Apply knowledge and practice of automobile air conditioning	Automobile Air conditioning	4	**4.0**
Demonstrate knowledge and practice in installation and Insulation of Pipes and Ducts in Refrigeration and Air conditioning	Installation and Insulation of Pipes and Ducts	4	**3.0**
Demonstrate knowledge and practice in Refrigeration Plant Maintenance	Refrigeration Plant Maintenance	4	**3.0**
Apply principles and practice of technical drawing techniques	Technical Drawings	1,2, 3,4	**12.0**
Demonstrate knowledge and practice of collaborative skill work in refrigeration and air conditioning on Work Based Experience	Work Based Experience	1 , 2, 3, 4	**91.0**
	Total number of credits		**240**



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