

## ARUSHA TECHNICAL COLLEGE

Tel.:+255 27 2503040/2075/2076

Fax No: +255 27 254 8337

P. O. Box 296, Arusha, Tanzania



Junction of Moshi-Arusha and Nairobi Roads

Email: principal@atc.ac.tz

Website: www.atc.ac.tz

### MECHANICAL ENGINEERING DEPARTMENT

**1.0.SHORT COURSE TITLE:** Air-Conditioning and Refrigeration

**2.0.HOST DEPARTMENT:** Mechanical Engineering Department

**3.0.VENUE/PLACE:** Arusha Technical College (ATC)

**4.0. COURSE DURATION:** Four (4) weeks

**5.0.COURSE COST:** TZS 400,000= (tuition fee and educational field visits)

#### 6.0.COURSE OBJECTIVES

##### 6.1. GENERAL OBJECTIVE

This course is intended to train participants with the basics, working principles, maintenance and applications (both domestic and industrial) of air-conditioning and refrigeration, environmental and general safety measures of refrigeration industry.

##### 6.2. SPECIFIC OBJECTIVES

At the end of the course, a trainee should be able to:

- (i) Identify and explain Air-Conditioning/Refrigeration components/equipment
- (ii) Design and do installation and servicing of plants
- (iii)Identify types of refrigerants
- (iv)Maintain and repair commercial systems
- (v) Trouble shoot and repair equipment

#### 7.0. TARGET GROUP

Artisans and Supervisors

## TIME TABLE

### MONDAY

Time	TOPIC	Hours
14.30-15.30	Registration and Formalization	1.5
15.30-15.45	<b>Short Break</b>	0.25
15.45-17.00	Introduction: Refrigeration Types: Non-Mechanical Refrigeration and Mechanical Refrigeration	0.75
17.00-17.30	Discussion	0.50
<b>Total</b>		<b>3.00</b>

### TUESDAY

1 <sup>st</sup> SATURDAY	TOPIC	
8.30-10.00	Mechanical Refrigeration System a) Working Principles b) Components i. Compressors ii. Condensers iii. Evaporators iv. Expansion Devices	1.5
10.00-10.30	<b>Short Break</b>	0.50
10.30-12.30	Refrigeration Equipment and Materials a) Equipments i. Tools ii. Vacuum Pumps iii. Service cylinders iv. Pressure and Temperature Gauges b) Materials i. Refrigerants ii. Tubing/Gasketing iii. Refrigeration Oils	2.00
12.30-13.30	<b>LUNCH BREAK</b>	1.00
13.30-15.30	Applications a) Domestic Water /Bottle Coolers b) Cryogenics c) Commercial and Industrial i. Refrigerated Trucks ii. Marine Refrigeration iii. Cold Rooms	2.00
15.30-16.30	Servicing and Trouble Shooting	1.00
16.30-17.30	Environment and Pollution Hazards	1.00
<b>Total</b>		<b>9.00</b>

**WEDNESDAY**

<b>Time</b>	<b>TOPIC</b>	<b>Hours</b>
14.30-16.00	Psychrometry: a) Properties of Air b) Heating and Cooling Air-Conditioning a) a)Comfort Factors b) Temperature	1.5
16.00-16.15	<b>Short Break</b>	0.25
16.15-17.00	Air-Conditioning Cont c) Humidity d) Purity of Air e) Movement f) Types Comfort Air Conditioning Industrial/Aviation-Air Conditioning	0.75
17.00-17.30	Discussions	0.5
<b>Total</b>		<b>3.00</b>

**THURSDAY**

		<b>Hours</b>
8.30-10.00	Air-Conditioning System a) Working Principles b) Psychrometry Processes Humidification/Dehumidification Sensible / Latent Heating	2.00
10.00-10.30	<b>SHORT BREAK</b>	0.50
10.30-12.30	Air-Conditioning Load and Materials c) Heat Load Sources i. Occupants ii. Air-Infiltration iii. Solar Heating d) Materials Ducting/Insulation Grilling/Noise Suppressors	2.00
12.30-13.30	<b>Lunch Break</b>	1.00
13.30-15.00	Applications a) Domestic Window Type Units b) Central Systems	1.5
15.00-16.00	Servicing and Trouble Shooting	1.00
16.30-17.30	Course Evaluation - Certification	1.00
<b>Total</b>		<b>9.00</b>