



**Name of the Program(s): - Diploma or Advanced Diploma in Air Conditioning and Refrigeration Engineering (DACRE) / Diploma or Advanced Diploma in Air Conditioning (ADAC), Diploma or Advanced Diploma in Refrigeration Engineering (ADRE). Refrigeration and Air Conditioning Mechanic (RACM), Air Conditioning & Refrigeration Service Technician (ACRST), Commercial Air Conditioning Technician (CACT).**

Are you interested in earning your Diploma in Air Conditioning and Refrigeration Engineering (DACRE) or Refrigeration Engineering (ADRE) Professional degree? (DACRE or ADRE)™ certification, but you're unsure how to start the process? While this is a great step for your individual career, it doesn't have to be a complex one really if you study from GEPEA. This is the ultimate guide on DACRE™ or ADRE™ or RACM™ or CACT™ certification and it can be your easy roadmap for navigating this process. You may explore some common questions you might have about international Air Conditioning and Refrigeration Engineering certification holder.

**Why Study Air Conditioning and Refrigeration Engineering?**

The heating, ventilation, air-conditioning and refrigeration industry (HVAC&R) is growing, driven by population growth, globalization, consumer trends and climate change. Air-conditioning and Refrigeration professionals cover both electrical and mechanical areas, so careers are unique and varied. With desired wages, interesting work facilities and plenty of opportunity to build a long-term career, it's never been a better time to get into an HVAC&R career.



## What is Air Conditioning and Refrigeration (ACR) Engineering?

Air conditioning and Refrigeration (ACR) engineers mainly acts in design, install, repair and maintain the cooling systems. ACR engineers may have to do this for large and complex building and factories. ACR engineers cater to these needs basically; heating, cooling, humidifying, dehumidifying, cleaning, ventilating and effectiveness. If one aspires for a career which is different from others, which helps to sustain energy and offers one a variety of work in varied locations then this is the right career option for one. ACR engineers have formed an association, GEPEA would like contribute yours career journey and to promote economic well-being and advances one's career in every nation.



### **AIR CONDITIONING OR REFRIGERATION ENGINEERING PROFESSIONAL** **TRAININGS**

**Training Hours: 60 hours or 80 hours.**

**Program Duration:** 4 Months (For Single Area) or 8 Months (For Dual Area) (Certifications).

*Diploma in single area should be completed within 4 months (1 Semester) and Advanced Diploma for dual areas such as Air Conditioning and Refrigeration should be completed within 8 Months in two semesters respectively.*

**Admission Requirements:** A high school diploma or an associate degree in general science or science (or global equivalent), Secondary degree (high school diploma, associate degree, or the global equivalent).

**Other Requirements:** Any Science related degree are needed to take this course, but have some extra skills using laptop/computer and internet, E-mail for communications will help.

**Training Delivery:** The course duration will comprise 60 hours or 80 hours of self-study home based or lecture based delivery. The 60 or 80 hours will be delivered in 9 to 11 sessions online distance learning based on given course materials. This 4 months or 8 months' course aims to provide an introduction to the principles of air conditioning and refrigeration. The course will provide a basic understanding of the types of air conditioning and refrigeration systems, applications and operating principles.

# Syllabus Outline

Serial No.	Syllabus component	Assignment <b>TMA</b> (Tutor Mark Assignment) or <b>Case Study</b>	Board Questions ( <b>OBS</b> = Open Book System) Exam.	<b>MCQ</b> (Multiple Choice Questions) 10 Questions (each @ 2 marks)
	<b>9 parts will count 6 hours each</b> (9 parts/courses x 6 hours study each = 54 hours total) + Project Exercises Minimum 6 hours = <b>Grand Total 60 Hours.</b> <b>OR</b> <b>9 parts will count 7 hours each</b> (9 parts/courses x 7 hours study each= 63 hours total) + Project Exercises Minimum 17 hours = <b>Grand Total 80 Hours.</b>	<b>45</b>	<b>35</b>	<b>20</b>
<b>1</b>	<b>Diploma or Advanced Diploma in Air Conditioning and Refrigeration Engineering (DACRE) /</b> <b>Diploma or Advanced Diploma in Air Conditioning (ADAC),</b> <b>Diploma or Advanced Diploma in Refrigeration Engineering (ADRE).</b> <b>Refrigeration and Air Conditioning Mechanic (RACM),</b> <b>Air Conditioning &amp; Refrigeration Service Technician (ACRST),</b> <b>Commercial Air Conditioning Technician (CACT).</b>	<i>60 Hours (Time) or 80 Hours (Time)</i>		
	<p style="text-align: center;"><b>SEMESTER -1</b></p> <p><b><u>1. Introduction to Refrigeration Systems:</u></b></p> <p>Refrigeration: Heat and Refrigeration Principles 2.0.0 Mechanical Refrigeration Systems 3.0.0 Refrigerants 4.0.0 Refrigerant Safety 5.0.0 Refrigerant Equipment 6.0.0 Installation of Refrigeration Equipment 7.0.0 Maintenance, Service, and Repair of Refrigeration Equipment 8.0.0 Maintenance of Compressors 9.0.0 Maintenance of Motors.</p> <p><b><u>2. Refrigeration System Components/Parts:</u></b></p> <p><b>Compressors:</b> Classification of compressors Reciprocating compressors Performance of reciprocating compressors</p>	<p style="text-align: center;"><b>45</b></p> <p style="text-align: center;"><i>6 or 7 Credit Hours Per Subject</i></p>	<b>35</b>	<b>20</b>

**Refrigerator-Definition, Main Parts or Component,  
Working Principle, Advantages, Disadvantages,  
Application**

Refrigerator-Definition

Main 4 Parts or Component of Refrigerator

Advantages, Disadvantages, Application of Refrigerator

Some Precaution during uses of Refrigerator

**3. Air Conditioning & Refrigeration:**

**Chapter 1.** Introduction 1.1 **Chapter 2.** Psychrometrics  
2.1 **Chapter 3.** Heat and Moisture Transfer through  
Building Envelope 3.1 **Chapter 4.** Indoor and Outdoor  
Design Conditions 4.1 **Chapter 5.** Energy Management  
and Control Systems 5.1 **Chapter 6.** Load Calculations 6.1  
**Chapter 7.** Water Systems 7.1 **Chapter 8.** Heating  
Systems, Furnaces, and Boilers 8.1 **Chapter 9.**  
Refrigerants, Refrigeration Cycles, and Refrigeration  
Systems 9.1 **Chapter 10.** Refrigeration Systems:  
Components 10.1 **Chapter 11.** Refrigeration Systems:  
Reciprocating, Rotary, Scroll, and Screw 11.1

**Chapter 12.** Heat Pumps, Heat Recovery, Gas Cooling,  
and Cogeneration Systems 12.1 **Chapter 13.** Refrigeration  
Systems: Centrifugal 13.1 **Chapter 14.** Refrigeration  
Systems: Absorption 14.1 **Chapter 15.** Air Systems:  
Components—Fans, Coils, Filters, and Humidifiers 15.1  
**Chapter 16.** Air Systems: Equipment—Air-Handling Units  
and Packaged Units 16.1 **Chapter 17.** Air Systems: Air  
Duct Design 17.1 **Chapter 18.** Air Systems: Space Air  
Diffusion 18.1 **Chapter 19.** Sound Control 19.1 **Chapter**  
**20.** Air Systems: Basics and Constant-Volume Systems  
20.1 **Chapter 21.** Air Systems: Variable-Air-Volume  
Systems 21.1 **Chapter 22.** Air Systems: VAV Systems—  
Fan Combination, System Pressure, and Smoke Control  
22.1 **Chapter 23.** Air Systems: Minimum Ventilation and  
VAV System Controls 23.1 **Chapter 24.** Improving Indoor  
Air Quality 24.1 **Chapter 25.** Energy Management and  
Global Warming 25.1 **Chapter 26.** Air Conditioning  
Systems: System Classification, Selection, and Individual  
Systems 26.1 viii CONTENTS SH\_\_ ST\_\_ LG\_\_ RH\_\_ TX  
39445 Wang (MCGHP) FM FIRST PASS pg viii LMM  
6/29/2K DF **Chapter 27.** Air Conditioning Systems:  
Evaporative Cooling Systems and Evaporative Coolers  
27.1 **Chapter 28.** Air Conditioning Systems: Space  
Conditioning Systems 28.1 **Chapter 29.** Air Conditioning  
Systems: Packaged Systems and Desiccant-Based  
Systems 29.1 **Chapter 30.** Air Conditioning Systems:  
Central Systems and Clean-Room Systems 30.1 **Chapter**  
**31.** Air Conditioning Systems: Thermal Storage Systems  
31.1 **Chapter 32.** Commissioning and Maintenance 32.1

*6 or 7  
Credit  
Hours Per  
Subject*

#### **4. Air Conditioning and Refrigeration-Commercial/Industrial AC Systems:**

Air Conditioning and Refrigeration Tools & Instruments  
Development of Refrigeration  
Voltage, Current and Resistance  
Solenoids and Valves  
Electric Motors: Selection, operational Characteristics and Problems  
Refrigeration Compressors  
Condensers, Chillers and Cooling Towers  
Working with Water Cooling Problems  
Evaporators  
Refrigerant: Flow Control  
Servicing and Safety  
Freezers  
Temperature, Psychometrics and Air Control  
Comfort Air Conditioning  
**Commercial Air Conditioning Systems**  
Various Types of Air Conditioners and Heat Pumps  
Installing & Controlling Electrical Power for Air Conditioning Units  
Estimating Load and Insulating Pipes

*6 or 7  
Credit  
Hours Per  
Subject*

#### **5. Commercial or Industrial Refrigeration Systems:**

**An introduction to commercial and industrial refrigeration systems**  
Freezing and chilling of products  
Factors affecting freezing and chilling  
Freezing or chilling of solids  
Cool room  
Refrigerated enclosures and cabinets  
Liquid chilling  
Refrigeration plant  
Cold Storage  
Plate freezer  
Cold room and freezer room  
Chest freezer  
Well freezer  
Quick freezing  
Freezing tunnel  
Forced draft cooler  
Frost heave  
Defrosting  
Intercooler  
Baudelot cooler  
Liquid overfeed system (liquid recirculation)  
Cascade refrigerating system etc.  
**Commercial Refrigeration Systems – Medium Temperature**

## SEMESTER -2

### **6. Applications of Refrigeration & Air Conditioning:**

**i. Applications of refrigeration in:** a) Food processing, preservation and distribution (Section 3.2) b) Chemical and process industries (Section 3.3) c) Special Applications such as cold treatment of metals, medical, construction, ice skating etc. (Section 3.4) d) Comfort air-conditioning (Section 3.5)

**ii. Applications of air conditioning, namely:** a) Industrial, such as in textiles, printing, manufacturing, photographic, computer rooms, power plants, vehicular etc. (Section 3.5.1) b) Comfort – commercial, residential etc. (Section 3.5.2).

### **7. Air Conditioner System Components/Parts:**

#### **AC SYSTEM EQUIPMENT**

Most air conditioning systems have five mechanical components:

- a Compressor
- a Condensor
- an Evaporator Coil
- Blower
- a Chemical Refrigerant

#### **Equipment Used in an Air Conditioning System:**

Circulation fan, Air conditioning unit, Supply duct, Supply outlets, Return outlets, Filters.

Hints: <https://www.theengineerspost.com/types-of-air-conditioning-system/>

Winter Air Conditioning System, Summer Air Conditioning System, All year round Air Conditioning System etc.

### **8. Tools Commonly Used by Refrigeration and Air-Conditioning Technicians**

1 Copper tube cutter 18 Weighing scale 2 Deburring tools 19 Tool kit for press fittings (Lokring) 3 Flaring tool (other types are available) 20 21 Non-metallic abrasive pad Phosphorus brazing alloy, silver 4 Pipe calibration tools (internal/external) 22 brazing alloy & flux Pipe bending tools 5 Ruler, pen & pencil 23 Engineer's square 6 Adjustable wrench 24 Recovery and recycling unit 7 Torque wrench 25 Vacuum gauge 8 Tube expander tool & expander heads 26 27 Vacuum pump Oxy-acetylene torch set 9 Vernier calliper 28 Electronic leak detector and 10 Oil can calibrated leak test 11 Torch igniter 12 Rubber mallet 13 Safety glasses & insulating gloves 14 Refrigeration ratchet 15 Spray bottle (for leak detection) 16 Manifold gauge 17 Hoses.

*6 or 7  
Credit  
Hours Per  
Subject*



**9. HVAC Systems / Heating, Ventilating and Air Conditioning (HVAC):**

**HVAC AND REFRIGERATION SYSTEM**

Air-Conditioning Systems  
Refrigeration Systems (for processes)  
Types of Refrigeration System  
Absorption Refrigeration  
Absorption Refrigeration  
Common Refrigerants and Properties  
Compressor Types and Application  
Selection of a Suitable Refrigeration System  
Factors Affecting Performance & Energy Efficiency of Refrigeration Plants  
Energy Saving Opportunities

**HVAC COMPONENTS AND SYSTEMS**

HVAC Components  
Background  
Source Components  
Distribution Components  
Delivery Components

**HVAC Systems** .....  
Local Systems .....  
Central Systems .....  
All-Air Systems .....  
All-Water Systems .....  
Air-Water Systems .....  
Water-Source Heat Pumps .....  
Application Examples .....  
Single-Family Residence .....  
Branch Bank .....  
Church .....  
Government Office Building .....

**OPTIONAL SUBJECTS (Any one /Two subjects can be chosen):**

### Advances in Air Conditioning Technologies  
### Advances in Refrigeration Technologies  
### Innovations in HVAC Technology  
### Automation and Control of HVAC Systems

**FOLLOWING ADDITIONAL TASKS SHOULD HAVE TO DONE BY PARTICIPANTS OR STUDENTS:**

- Air Conditioning & Refrigeration Engineering Certification Test MCQ Questions answer practicing
- Air Conditioning & Refrigeration Engineering Test Board Questions/TMA (Tutor Mark Assignment)
- Air Conditioning & Refrigeration Engineering Case Studies

**Exercises and projects**

*6 or 7  
Credit  
Hours Per  
Subject*

	<b>Project/Thesis/Case Studies</b>			
	<p>Student have to take a Project/Thesis/Case studies as per their major subject in order to complete his/her Diploma/Advanced Diploma.</p> <ul style="list-style-type: none"> <li>In case Project/Thesis, respective students should submit 35 to 45 (A4 Size) pages long report. <i>Course Tutor or Concern Authority will assign/fix Project/Thesis Topic or Title with consultation with respective student.</i></li> <li>In Case Studies, respective students should submit case studies answer script in written form to the GEPEA within stipulated time frame. <i>Concern Authority will assign case studies question paper in time.</i></li> </ul>			
	<p><b>TOTAL HOURS REQUIRED TO BE COMPLETED FOR THE AIR CONDITIONING &amp; REFRIGERATION ENGINEERING DIPLOMA OR PROFESSIONAL CERTIFICATIONS = 9 parts will count 6 hours each (9 parts/courses x 6 hours study each = 54 hours total) + Project Exercises Minimum 6 hours = Grand Total 60 Hours. OR 9 parts will count 7 hours each (9 parts/courses x 7 hours study each= 63 hours total) + Project Exercises Minimum 17 hours = Grand Total 80 Hours.</b></p>			

## WHY STUDY REFRIGERATION AND AIR CONDITIONING ENGINEERING DIPLOMA?

Through studying Diploma of GEPEA respective students will have wide scope to advance your existing skill set and broaden your employment opportunities with this advanced course in air-conditioning and refrigeration engineering. Expand your skill set to develop systems, select equipment, and commission, maintain and diagnose faults of refrigeration systems and air-conditioning equipment.

The Internationally recognized Diploma of Air-conditioning and Refrigeration Engineering prepares you to work with commercial food storage, preservation and air-conditioning and air-distribution equipment. Learn to design and deploy commercial industrial refrigeration systems and design control systems for HVAC & R.

## WHY AIR CONDITIONING AND REFRIGERATION ENGINEERING CAREER? Career Opportunities:

- AC Service Technician
- Assembly and testing of refrigerators and air-conditioners in manufacturing companies
- Installation & maintenance of centralized AC plants, cold storage etc.
- Repairing and preventive maintenance of refrigerators, air- conditioners, water coolers etc.
- Sales of refrigerators, air-conditioners, water coolers
- Electrical maintenance in manufacturing companies and many others.



## WHAT DOES REFRIGERATION AND AIR CONDITIONING MECHANIC DO?

As a Refrigeration/Air Conditioning Mechanic, your duties may include:

- Installing, troubleshooting and overhauling entire heating, ventilation, air conditioning and refrigeration systems
- Measuring refrigeration or air conditioning components for installation
- Working with hand and power tools to install refrigeration or air conditioning components
- Measuring and cutting piping, and connecting piping using welding equipment
- Testing heating, ventilation, air conditioning and refrigeration systems for leaks
- Performing routine maintenance
- Repairing and replacing components for entire heating, ventilation, air conditioning and refrigeration systems
- Installing, maintaining and repairing equipment in refrigerated trucks
- Preparing work estimates
- Reading and interpreting blueprints etc.

## COURSE MATERIAL

Besides using the traditional books GEPEA has also modernized the learning process by providing students with online portal consisting of –

- **Study Materials (Soft copies)** – PDF of books are provided to students making studies nomadic & convenient. GEPEA Department of Students Affairs will assign Study Materials via Email or other methods after registration and admission.
- The focal point of **GEPEA** study materials is enhancing Practical Education. **GEPEA** Kit provided to applicants is a world full of practical scenarios, explanation in terms of facts rather than theoretical phrases. Customized to be self-explanatory & easy to understand.
- **Faculty Guidance** – GEPEA panel of intellectuals guide students personally with regards to any query through email about any concept in the notes provided, being the author of the same.

## EXAMINATION

**GEPEA** Professionals are given the privilege to answer exams from any examination center in the world along with the freedom to pick the exam schedule for the same, as time permits in the particular examination months of GEPEA. Students are allotted 2 modes of examinations – Home Based/Center Based.

- Question papers would be drafted by **GEPEA** panel of veteran professors which would be TMA (Tutor Mark Assignment), OBS (Open Book System) and MCQ study pattern. A single course will consist 100 marks based on these three pattern of exam types. In each program will consist a major (Thesis Research) course or theory in order to complete the respective Diploma Program.
- This unique & novel methodology teaches a student how to assess business situations and make decisions based upon those assessments, allowing students to display their potential.
- In case of home based/distance learning exams question paper would be emailed to the students, which they would have to answer & courier back to GEPEA office or GEPEA directed authority in the respectable exam slab.
- Candidate also has the option of appearing for Center Based Examination wherein they would have to visit one of the many GEPEA exam centers & complete answering the exam in the duration of 3 hours which wouldn't be an open book examination.

## **CASE STUDY METHOD & STUDY MATERIAL:**

Today communication systems have advanced so much that it is much easier, convenient and quicker to gain expertise via online distance learning. GEPEA offer potential students the opportunity to study through an autonomous online distance learning program. This means that people who can't get traditional further education can still achieve what they want and get their qualifications through Online Distance Learning. That gives the opportunity for a much wider range of people to get the qualifications that they want. Today, thanks to technological advances, higher education is more readily available to those who want it.

GEPEA is an institute of excellence offering widest range of autonomous programmes in the field of Business Management and different Professional Training education. In response to the rapidly changing economic environment and the process of globalization, the Academy has made sustained efforts to bring an international perspective to all its wide range of areas and activities.

## **BENEFITS AND FETURES:**

- (i) **Flexible Programs & Curriculum:** You can earn and study at the same time! From GEPEA International Curriculum, Flexibility is the biggest advantage of distance learning courses. This stands true especially if you are a working professional. Not everyone has the luxury of taking their own time to finish their studies. For those who had to take a break from studies to start working, such courses are a boon and provide the opportunity to pursue higher education.
- (ii) **Saves Time & Energy:** You save up a lot of time and energy on commuting. You can stay at any place and pursue a course that is available at GEPEA. Or you might be based out of a remote village or town which does not have enough options for higher studies. Distance learning courses eliminate these obstacles.
- (iii) **MCQ, Case Based Learning:** MCQ, A Case-based approach engages students in discussion of specific situations, typically real-world examples of African, Asian and International companies. Allowing the students to put their theoretical knowledge to practice.
- (iv) **Study at your own Pace:** Not everyone has the same pace of learning. Some students pick up things fast, others need time to grasp a concept. One of the biggest advantages of distance learning is that you can study at a pace that is comfortable for you.
- (v) **Saves Money:** These courses are almost always cheaper as compared to their on-campus counter-parts. You also cut down on the costs incurred while commuting etc.
- (vi) **Personal Fulfillment:** An MBA is the key to unlocking both a professionally and personally rewarding future. Education is the foundation upon which you can build lifelong business and personal achievements. The GEPEA MBA program is designed to enrich your personal life, as well as to keep you informed about a constantly changing industry.
- (vii) **Convenient:** You can submit your assignment with the click of a button or simply drop it off at a post-office! It's sometimes as simple as that!
- (viii) **24X7 Access to Study Material & fellow Students:** This is the best way to study if you are comfortable with internet and technology. You can access your study material online whenever you want and also clear doubts, exchange views and discuss with your virtual class-mates!
- (ix) **Study any Topic You Want:** Since you'd already have all your books/online study material with you, you can pick up any topic/chapter that interests you and tackle that first! This way your interest in the subject is

sustained.

- (x) **Higher Level of Self-Confidence:** The knowledge gained through our Correspondence MBA program will enhance your effectiveness in your current position and help define your future career path. It will sharpen your skills in critical business areas, giving you the self-confidence you need to become a leader in your profession.
- (xi) **Specialization:** We provide more than 80 specializations which allow students to gain additional knowledge and background on specific business topics.

## **ACCREDITATIONS AND RECOGNITIONS:**

### **ITQSM Accredited & International Partnered Professional Academies.**

GEPEA has proudly claimed the Excellence in Online Distance Learning Award presented by its Governing Body Really Matters as a token of appreciation for providing top notch education to professionals globally. This solely proclaims that GEPEA is one of the best Professional Academy in the field of online distance learning.

## **PROFESSIONAL FACULTIES:**

GEPEA Faculty members are highly professional, qualified & experienced. Professors provide substantial assistance through 24\*7 web support. Each & every query regarding studies, assignments, cases, projects, research are resolved on time & responded with clear, relevant answers on par with syllabus. They update themselves from time to time about the changing market scenario & syllabus. Thus working professionals have chance to get resourceful information by interacting with professors through web-support from time to time. Timely communication & assistance is key to our successful association with our students & our professors believe in same.

## ***GEPEA (Global Educational & Professional Excellence Academy)***

*In case any query, please feel free to contact us via E-Mail:  
[gepea.official@gmail.com](mailto:gepea.official@gmail.com) , [office@gepea.eu](mailto:office@gepea.eu) or visit Website: [www.gepea.eu](http://www.gepea.eu) or  
[www.gepea.education](http://www.gepea.education)*