

**SYLLABUS FOR
D.VOC IN REFRIGERATION & AIR CONDITIONING**

CENTRE FOR LIFELONG LEARNING



GANDHIGRAM RURAL INSTITUTE - DEEMED TO BE UNIVERSITY

(Ministry of Human Resource Development, Govt. of India)

Accredited by NAAC with 'A' Grade (3rd Cycle)

CENTRE FOR LIFELONG LEARNING

GANDHIGRAM-624 302, DINDIGUL DISTRICT

TAMIL NADU

GANDHIGRAM RURAL INSTITUTE-DEEMED TO BE UNIVERSITY

Gandhigram – 624 302, Dindigul District, Tamil Nadu

[Funded by UGC, New Delhi]

Structure and Content of the

D.VOC IN REFRIGERATION & AIR CONDITIONING

(With effect from 2018)

1. Introduction:

The Gandhigram Rural Institute (GRI) - Deemed to be University, Gandhigram is one of the pioneering institutions working for rural development and preparing human resources for managing rural development during last six decades. In GRI -DU, the Department of Lifelong Learning and Extension has been mainly working for the Vocational Education and Training for skill development within the framework of University System. In the light of strengthening Teaching, Training and Research in the area of Lifelong Learning, attempts are being made to revisit and revise the existing curriculum of different academic courses and developing new curricula for offering courses at various levels. In this context, the Department focus on the “skills and knowledge” needed to work with people in various employment settings in the rural and semi-urban areas, particularly in the unorganized sector and also in the Non-Governmental organizations.

The Lifelong Learning has become a fundamental goal of recent educational policies as a way to achieve socio-economic development and as a tool for promoting knowledge based society. The Department of Lifelong Learning and Extension has been conducting more than 15 trades of Skill development training during two decades. Among the skill development training programmes, training in the domain of in Refrigeration & Air Conditioning servicing has been taken up to offer a **One - Year D.Voc in Refrigeration & Air Conditioning** from 2018 onwards. This programme enables the students to have **employable skills** that help to secure an employment in public, private sector and also to become an entrepreneur. The department has required physical and social infrastructure facilities including technical expertise to support this programme.

Justification:

In the present days, lot of educated unemployed individuals are seeking for suitable skill training courses which resulting in Self-employment or to promote entrepreneurs. The purpose of D. Voc in Refrigeration & Air Conditioning (*henceforth known as R&AC in this text*) is produce professional trained youth to meet the human resource needs of the industry.

Refrigeration & Air Conditioning has become part of everybody's life; right from top corporate business house, storage business, restaurants, individual homes etc. The *R&AC* industry is one of the most demanding industries in the modern world. In order to complete the servicing and maintenance work within the time frame, requires dedicated trained professionals. Therefore, the Diploma programme is structured to focus on the vital components of the skills sets required for the R&AC sector. Moreover, the syllabus is designed to include the theoretical as well as practical aspects of the cooling system of various scales.

Above all, the University Grants Commission (UGC) and the Ministry of Human Resource Development (MHRD), Government of India has been emphasizing on the importance of Diploma / Degree in the Vocational Domain as an integral part of higher education system. Therefore, it is proposed to offer a Diploma programme in Refrigeration & Air Conditioning.

2. Objectives:

- To enable the students to acquire appropriate and adequate technical knowledge with the professional skills and competencies in the field of Refrigeration and Air Conditioning.
- To train the students to upscale their skills for starting self-employment as well as to provide appropriate employment opportunities.

3. STRUCTURE OF DIPLOMA PROGRAMME

Semester	Course Code	Category	Title of course	No. of Credits	Duration of ESE hours	CFA	ESE	Total
First	18DRAC101	SDC	Basics of Electrical & Electronics	6 (T3 + P3)	2	60	40	100
	18DRAC102	SDC	Basics of Refrigeration	6 (T3 + P3)	2	60	40	100
	18DRAC103	SDC	Basics of Air Conditioning	6 (T3 + P3)	2	60	40	100
	18DRAC104	SDC	R&AC Machines	6 (T3 + P3)	2	60	40	100
	18DRAC105	GEC	Customer Relationship Management	6 (T4 + P2)	3	40	60	100
Sub Total (A)				30	-	280	220	500
Second	18DRAC206	SDC	Refrigeration & Air Conditioning Applications	6 (T3 + P3)	3	40	60	100
	18DRAC 207	SDC	Engineering Drawing	4 (T0 + P4)	2	60	40	100
	18DRAC 208	SDC	Internship for hands on experience**	20	-	-	100	100
Sub Total (B)				30	-	100	200	300
Total (A + B)				60	-	380	420	800

** Practical examination will be conducted by GRI

4. Methodology

The D.Voc in Refrigerator and Air Conditioning programme is of two semester duration and follows the credit system. In the first semester the students are introduced to the essential elements and appropriate practice in the form of practical training is provided in the first semester. There are five courses in the first semester. Each course have both Theory and Practical components. The evaluation and Grading will be done as per the GRI pattern. Each course will be evaluated for a maximum of 100 marks – Combining both Theory and Practical components. Being a skill based programme, the passing minimum marks will be 40%.

Teaching and Training process includes the following:

- Classroom sessions, Demonstration
- Hands-on-Experience in the industry
- ICT enabled interactive sessions

- Industrial Placement
- Exposure Visit to Industry

5. Admission related matters:

- The minimum educational qualification for admission in the Diploma is +2 pass or equivalent including NIOS from any recognized board or university.
- Medium of instruction will be an English and Tamil. Question Paper will be in both English and Tamil.
- Provision is made to enroll students who will come up to this level following the National Vocation Education Qualifying Framework (NVEQF) / National Skill Qualifying Framework (NSQF).
- Reservation to SC, ST, OBC and Differently - Abled and Service Personnel categories will be made as per the Government of India (GoI) Norms
- There shall be no age bar for admission in the programme.
- The selected students have to pay Fee as per the GRI Norms. Maximum enrollment for the programme is 25.

6. Examination related matters:

- The Controller of Examination, GRI shall conduct the End Semester Examination [ESE] as is being practiced in the case of other Certificate / Diploma Programmes.
- The respective course teacher will be the examiner.
- The Industry Experts, if required, can be invited for conducting the practical Examinations.
- For theory papers, assessment is based on End Semester Examination only.
- A student will be declared to have passed in a course when she / he has scored a minimum of 40% both theory and practical.
- In the case of student absent / failed in a subject in a semester examination, she / he have to write Theory / Practical examinations for that subject during the subsequent semesters.
- A student has to pass the course with maximum of 5 attempts [1+4 times]

7. Industry collaboration:

- Networking with identified Refrigeration and Air Conditioning Service Centre's , Technical Institutions, Industries to provide Practical Training for hands-on experience.
- Signing of Memorandum of Understanding [MOU] by the Department of Lifelong Learning and Extension with identified Refrigeration and Air Conditioning Service Centres and Technical Institutions.
- Experts available in the Industrial Units / Technical Institutions will be invited as Guest Faculty
- During the second semester for the Practical Training students are placed in the Service Centres / Industries for Internship programme.

8. Content of the Programme

FIRST SEMESTER

PAPER I - BASICS OF ELECTRICAL & ELECTRONICS

Course Code: 18DRAC1 01	Credits: Theory - 3; Practical – 3	Marks - 100
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Objectives:

- To provide the basic knowledge on electrical and electronics.
- To enable to understand the electronic accessories and its function.
- To have hands on experience in the electronic components & instruments

UNIT - I

Introduction to Electricity, Safety precaution and first aid - Molecule, Atom, and how Electricity is Produced - Electric current, Voltage, Resistance - Temperature variation of resistance, Difference between AC and DC voltage and current - Ohm's Law - Series – parallel resistance circuits - Cells and Batteries - Energy and Power.

UNIT - II

Generation of A.C. voltage, its generation and wave shape - Cycle, frequency, Phase difference - power and power factor - A.C. Series Circuits with (i) resistance and inductance (ii) resistance and capacitance and (iii) resistance inductance and capacitance, Q factor of R.L.C. series circuits.

UNIT - III

Capacitor and its capacity, Concept of charging and Discharging of capacitors, Types of Capacitors and their use in circuits, Series and parallel connection of capacitors, Energy stored in a capacitor. Electromagnets, their construction and use, Polarities of an electromagnet and rules for finding them.

UNIT - IV

Introduction to Electronics - Basic Principles of semiconductors, Principles and application of Diodes, Semiconductor materials, Metals and Semiconductors and Photo-electric emission. N-type and P-type semiconductor, Effects of temperature on Conductivity of semiconductor. Forward & Reverse bias - Types and applications of diode.

UNIT - V

Rectification - Zener diode as voltage regulator – transistors parameters- CB, CE, CC, configuration, amplification. SCR. Photo diodes, photo transistors, multi – vibrator, CR & LR circuit. SCRs, UJTs, ICs.

Practical:

- Use of electrical hand tools Instruments.
- Joints on single and stranded conductors and soldering.
- Measurement of current, voltage, power and energy by voltmeter, Ammeter.
- Measurement of resistance with Ohm meters.
- Formation of simple electrical circuit, series circuit and parallel circuit
- Fixing and connecting electrical switches, holder, fuses.
- Identification of Electronic components & instruments, colour coding of resistors, verification of ohms - Practice of soldering & de soldering.
- Identification of transistors, resistors, capacitors, diodes, S.C.R, U.J.T, I.Cs. used in refrigeration & AC, Full wave and bridge rectifier circuit, voltage regulators.
- Construction of low voltage Power Supply. Construction of transistor amplifier circuit – Applications of photo transistor.

References:

1. Bakshi U.A. (2008), Bakshi V.U, Fundamentals of Electricity, Technical Publications
2. Bhattacharya S.K (2011 Edition), Basic Electrical and Electronics Engineering, Pearson India publication
3. Mehta - Gupta (1996), Basic Electrical Engineering, Dhanpat Rai Publishing Company (P) Ltd.
4. Paul Horowitz, WinField Hill (2011), The Art of Electronics, Dhanpat Rai Publishing Company (P) Ltd.
5. Sahdev SK (April 2015), Basic Electrical Engineering, Pearson Education India
6. Theraja B.L and Theraja AK (2012), ABC of Electrical Engineering and Electronics, Chand publication.

PAPER II - BASICS OF REFRIGERATION

Course Code: 18DRAC1 02

Credits: Theory – 3; Practical – 3

Marks - 100

Objectives:

- To provide the basic knowledge on Principles and functions of Refrigeration
- To enable to understand the types & Electrical components in the Refrigerator.
- To have hands-on-experience by the students in fault finding, rectifications in the Refrigerator.

UNIT - I

Refrigeration introduction - its meaning and application - unit of refrigeration - various methods of refrigeration - Pressure & its Measurements. Thermodynamics law.

UNIT - II

Refrigeration tools and function: cutting, bending, swaging, flaring and pinching technique – conventional and frost free refrigerators.

UNIT - III

Refrigeration systems - science related to refrigeration – work, power, energy, force, Heat and Temperature - Different temperature scales, Thermometers, Units of heat, sensible heat, latent heat, super heating and sub-cooling, saturation temperature , pressure, types, units.

UNIT - IV

Types of Refrigeration systems - Ton of Refrigeration, Study the construction and working of vapor compression cycle, low side & high side of vapour compression system - Applications of vapour compression cycle.

UNIT - V

The electrical components of refrigerator - the mechanical components of refrigerator and their types - Importance of flushing in evaporator and condenser, necessity of replacing capillary and drier. Evacuation, leak testing, gas charging method in refrigerator - Care and maintenance - installation method.

Practical:

- Familiarization & use of general and special tools used in refrigeration work practice.
- Identification of various Refrigeration equipments & components of vapor compression system like, compressor, condenser, expansion valve and evaporator etc.
- Working on soft copper tubing like, cutting, bending, flaring, swaging, pinching process & preparing flare joints.
- Brazing of tube joints (Cu to Cu, Cu to Steel, Cu to Brass) testing of components, Checking Door alignment & replacing of gaskets.
- Tracing the electrical and mechanical components of sealed refrigerator.
- Testing Thermostats & semi automatic defrost system, Testing of compressor,
- Cleaning, Flushing, replacing capillary and drier, fault rectification, evacuation, leak testing, gas charging in Refrigerator.

References:

1. Arora C P (2008), Refrigeration and Air Conditioning, McGraw - Hill India Publishing Ltd
2. J.K. Gupta, R. S. Khurmi, (2006) Refrigeration and Air Conditioning, Pearson education, New Delhi
3. Ramesh Arora, Ramesh Chandra, (2012) Refrigeration and Air Conditioning, Prentice Hall of India Publisher
4. Roy J. Dossat (2001 Revised), Principles of Refrigeration, Pearson education, New Delhi
5. Sarao A, Gaurav Agarawal, (2014) Refrigeration and Air Conditioning, Pearson education, New Delhi

PAPER III - BASICS OF AIR CONDITIONING

Course Code: 18DRAC1 03 Credits: Theory - 3; Practical - 3 Marks - 100

Objectives:

- To provide the basic knowledge on Principles and functions of Air Conditioner
- To enable the students to understand the types & Electrical components in the Air Conditioner
- To have hands-on-experience by the students in fault finding, rectifications of Air Conditioner

UNIT - I

Introduction - Its meaning and general application – Psychrometry - Definition, Composition of air, Daltons law of partial pressure - Gas and Vapour mixture, Dry and Wet bulb temperature, Wet bulb depression - Dew point - Saturated air.

UNIT - II

Specific humidity, Degree of saturation, Relative humidity, Absolute humidity, Humid specific volume and humid specific heat, Enthalpy of moist air - Sensible heating and cooling, Humidification and dehumidification and their methods.

UNIT - III

Thermal insulation – function – types - thermodynamic properties of heat insulation materials used in refrigeration and Air Conditioning systems - construction and working of window A.C, - Identify the electrical and mechanical components - wiring circuit - install gauge manifold in the system, evacuation, leak testing - gas charging.

UNIT - IV

Domestic AC - identifying various components - electrical circuits - testing components - fault detection - install gauge manifold in the system - leak testing - evacuation, gas charging, Installation - trouble shooting.

UNIT - V

Fundamentals of Central Air Conditioning - requirements of comfort A.C, - Study of psychometric terms, DBT, WBT, RH, Basic heat load - enthalpy, dew point, and specific humidity - Types of Central air conditioning .

Practical:

- Identify the electrical and mechanical components in Domestic AC
- AC installation, tracing wiring circuit, evacuation, leak testing, gas charging
- Identifying various components, electrical circuits, testing components in all types of Split AC.
- Water cooler - identify parts, controls & accessories specification of instant and storage type
- Soldering of Cu tube on Stainless steel, trouble shooting of commonly faced problems like condenser fan failure, corrosion etc.
- Charging Refrigerant, Servicing & maintenance of water cooler

References:

1. Ananthanarayanan P. N. (April 23, 2013), Basic Refrigeration and Air Conditioning Paperback , McGraw Hill education (India) (P) limited, New Delhi .
2. Andrew D. Althouse (Author), Carl H. Turnquist (Author), Alfred F., S.Chand publication Bracciano (Author), Daniel C. Bracciano (Author), Gloria M. Bracciano (Author) (2017), Modern Refrigeration and Air Conditioning), Goodheart - Wilcox Publihsers (20th Edition), Tinley Park, IL.
3. KHURMI R.H, GUPTA J.K (1987), Fifth Edition, Refrigeration and Air Conditioning, (Revised edition), S. Chand Publishing.
4. Khurmi RS (2006), Refrigeration and Air Conditioning, Pearson education, New Delhi
5. Langely (2003), Air Conditioning and Refrigeration Troubleshooting (2nd Edition), Pearson education, New Deplhi

PAPER IV - REFRIGERATORS & AIR CONDITIONER MACHINES

Course Code: 18DRAC1 04 Credits: Theory - 3; Practical - 3 Marks - 100

Objectives:

- To provide basic knowledge on working principles of the Compressor & Motors.
- To enable students to have knowledge on the components and its functions of Air Conditioner.
- To have hands-on-experience by students in brazing technique, copper pipe breezing swaged joint in Refrigerators & Air Conditioner.

UNIT – I

Compressor - Function, construction, working, application of compressor like, Reciprocating, rotary, scroll type - Study the construction & working of centrifugal compressor, wobble & swash plate compressor. Compressor efficiency factors, wet compression, oil, properties, lubrication methods.

UNIT - II

Working principle of three phase induction motor - Construction of squirrel cage induction motor - Importance of phase sequence - Construction of slip ring induction motor Comparison between SCIM and SRIM. Three phase motor starters. Common faults, causes and remedies in three phase AC motors.

UNIT - III

Drier - function of drier, types, application and its advantage - Expansion valve used in domestic refrigeration and air conditioning systems -

UNIT - IV

Evaporator - Function, types of evaporators used in refrigerator, water coolers, bottle coolers, window and split A.C, Super heating in evaporators- Classification of refrigerants, Properties - Refrigerant leak detection methods.

UNIT – V

Condenser - Function of condenser, types, Construction of air cooled condenser, Air cooled and water cooled condenser, Effect of choked condenser. Advantages, de scaling of air cooled condenser - functions and working.

Motors used in refrigeration and Air conditioning system, types, construction, working & their starting methods. Function of Starting relay, Capacitors, controlling devices.

Practical:

- Dismantling of Hermetic compressors, Identification of components.
- Servicing, cutting gaskets, lapping and assembling, Add oil , check efficiency (pumping)
- Compressors used in refrigerators, window & split A.C. types like, rotary wobble, swash plate, scroll, and compressors.
- Starting of compressor motor by RSIR, CSIR, and PSC & CSR method. Check and test relay, capacitors & OLP's.
- Familiarization with condensers used in Refrigerators, Bottle coolers, visible coolers, Deep freezer, window and Split A.C,
- Cleaning, Flushing and servicing of air cooled condenser, leak testing of condenser.
- Replacing drier, capillary tube, in refrigerator and window AC.
- Servicing of evaporators in refrigerators, bottle cooler, water coolers, window and split A.C, Leak test, Flushing, Defrosting.
- Identification of refrigerant cylinders, Identification of unknown refrigerants.
- Recovery & Transfer of refrigerant, safe handling Cylinders and Valves, Leak Testing, Evacuation, Charging refrigerants in Refrigerator.

References :

1. Hundy G.F, Refrigeration, Air Conditioning and Heat Pumps (5th Edition) Elsevier-Science-Technology Publisher, Oxford, United Kingdom
2. Khurmi R.S., , (2006), Refrigeration and Air-conditioning, S. Chand Publication.
3. R.S Khurmi (2010), Gupta J.K, CHAND. S, Refrigeration Tables with Chart
4. Refrigeration and Air Conditioning (RAC), (2017) SCRT, Tamil Nadu, Kerala and AICTE
5. Shan K. Wang (2015), Handbook of air conditioning and refrigeration (Second Edition) Mcgraw - Hill New York San Francisco Washington, D.C.
6. Yunus Cengel, Michael Boles (2017), Thermodynamics: An engineering approach, Pearson Education.

PAPER – V - CUSTOMER RELATIONSHIP MANAGEMENT

Course Code: 18DRAC105

Credits: Theory - 4;

Practical - 2

Marks - 100

Objective:

- To provide the basic knowledge of customer relationship
- To enable to understanding on good communication skills in service sector
- To have hands on experience on how to behave in the working atmosphere.

UNIT - I

Introduction to Customer Support - Importance of Customer - Types of Customers - their needs - Issues in dealing with the customers- Importance of maintaining good relations with customers in Service providing sector.

UNIT - II

Communication Skills for Customer Support – Intra personal communication and body language – Interpersonal communication in customer relationships – Features of an effective communication – Barriers and filters – Listening and active listening – Customer satisfaction and feedback

UNIT - III

Customer Relationship Skills - Leadership Skills - Team work and public speaking with customer - Importance of maintaining good - interpersonal relationship with Customer and co-workers - Effective communication in service -delivery.

UNIT - IV

Personality Traits in delivering Service - Self confidence - Attitude - Working in Group - Time Management - Effective Planning in service -delivery - Working towards Goal - Meditation and concentration techniques in the stress situation.

UNIT - V

Practical Exercise: Role playing in Workshop - Public speaking- Interview - work in a Team - Group Discussion - Discussion on Case Studies from shop Floor and Industry situation.

References:

1. Balaji (2002), Service Marketing and Management, S.Chand Publishers, New Delhi
2. Balasubramaniyan. K (2005), Essence of Customer Relationship Management, GIGO Publishing
3. Kaushik Mukerjee (2007), Customer Relationship Management, PHI Learning Private Limited, New Delhi
4. Sagadevan A, Peeru Mohamed H, (2002), Customer Relationship Management - A Step By step approach, Vikas Publishing, New Delhi.
5. Stephen P. Robbins and Mary Coulter (2012), Management (Eleventh Edition), Pearson Education, New Jersey

SECOND SEMESTER

PAPER VI - REFRIGERATION & AIR CONDITIONING APPLICATIONS

Course Code: 18DRAC206 Credits: Theory - 3; Practical - 3 Marks - 100

Objectives:

- To provide the basic knowledge R & AC application in the current situation
- Explore the students to the variety of R & AC machines for commercial purpose.
- To make them understand, the students have industrial visit.

UNIT - I

Food Preservation - factors contributing to food spoilage, methods of food preservation, freezing method of food preservation, preservation of food with direct contact of liquid N₂, freeze drying, preservation of different products, cold storage and commercial cabinets.

UNIT - II

Commercial Applications - air-conditioning of houses, offices, hotels and restaurants, air- conditioning of departmental stores - air-conditioning of theatres and auditoriums- hospitals and medical applications.

UNIT - III

Ice-Manufacturing - principles of ice production, different methods of ice manufacturing, treatment of water for making ice – brines - freezing tanks - ice cans and quality of ice.

UNIT - IV

Industrial Applications - importance of RH in different industries, ice-cream manufacturing, refrigeration for breweries, selection of refrigerant for breweries, use of liquid N₂ for fabric, quality, air conditioning in textile and photographic industries.

UNIT - V

Transport Air Conditioning - automobile air conditioning, railway air-conditioning, marine air conditioning - aircraft air conditioning - Planning for Preventive maintenance and scheduling of maintenance activities in large AC and Refrigeration plant.

Practical:

To visit the R & AC application units available in the campus and outside the campus its working nature and assembling models, units and environment.

References:

1. Arora C.P (2017), Refrigeration and Air Conditioning, McGraw Hill education (India) (P) limited, New Delhi
2. Arora S.C and Domkundwar S, Dhanpatrai and sons (1999) 5th Edition, Course in Refrigeration and Air Conditioning, Delhi
3. Manohar Prasad (2014), Refrigeration and Air Conditioning, New age international (P) limited, New Delhi

PAPER VII – ENGINEERING DRAWING

Course Code: 18DRAC207

Credits: Theory - 0;

Practical - 4

Marks - 100

Objectives:

- To provide the basic knowledge in Engineering Drawing and Instrument
- To provide the knowledge about dimensions and trade related drawings
- To provide the knowledge of reading blue prints and working cycle.

UNIT - I

Introduction to Engineering Drawing and Drawing instruments. Sheet lay out, line, types, dimensioning, types and symbol for drawing. Lettering of alphabets and numbers. Single stroke (vertical and inclined) Dimensioning, Aligned and unidirectional system, Scales, full scale and Half scale.

UNIT - II

Introduction to orthographic views of simple objects such as cubes, rectangular block, prism, pyramid etc. In 1st angle projection. Simple isometric views of solid & hollow object. Simple orthographic views of solid & hollow object in 3rd angle projection

UNIT - III

Trade related Drawing of compressor and pump parts such as piston, connecting rod, crank shaft valve etc., Trade related Drawing involving electrical Circuit Diagram.

UNIT - IV

Free hand sketching for trade related drawings - components in R & AC, diagram, tools and other machines, operational ways.

UNIT - V

Blue print Reading. Trade related wiring circuit of window, Split, package and central Air conditioning. Prepare charts related to trade like Refrigerator, water coolers, freezers, Vapour compression cycle, vapour absorption cycle and all types of compressor & Expansion valves, working cycle sketches.

References:

1. Dhananjay A Jolhe, Engineering Drawing, Tata McGraw Hill, 2007.
2. Dr.K.Venkata Reddy, Machine Drawing, 3rd edition, Dr.K.L.Narayanan, Dr.P.Kannaiah, New Age International (P) Ltd.,
3. K.Venkata Reddy, Text book of engineer drawing, , Publisher name . BS Pulisher (BSP).
4. K.Venugopal, (2000)Engineering Drawing and Graphics, New Age International (P) Ltd.
5. M.B. Shah and B.C. Rana, Engineering Drawing, person Education, Eds.2.2009.
6. N.D.Bhatt and V.M.Panchal (2005), Engineering Drawing, Charoter Publishing house.

PAPER – VIII – INTERNSHIP FOR HANDS – ON - EXPERIENCE

Course Code: 18DRAC208

Credits : 20

Marks: 100

OBJECTIVE:

- To learn skills for specific job role from relevant Industry / Institution

Students have to undergo four weeks training in any **R&AC Service Centre/ Central AC Plant/ Ice Manufacturing Plant** to acquire relevant skills. The in-plant training may be organized continuously for four weeks or more than one spell within a semester as per the convenience of the Agencies/Institutes. During their stay in the Agency, they have to maintain a diary on daily basis to record the work assigned, outcome of the work and it has to be countersigned by the student's in-charge. In addition, he/she has to submit weekly report to the department. During the in-plant training period, the Industry / Institute partner will evaluate their performance for 60 marks and the concerned course teacher for 40 marks as given below.

INDUSTRY/ AGENCY

1.	Attitude	10 marks
2.	Punctuality	
3.	Behavior	
4.	Involvement	10 marks
5.	Performance (completion of assigned work)	20 marks
6.	Contribution to the industry	20 marks
	Total	60 Marks

COURSE TEACHER

1.	Diary /Record	10 marks
2.	Weekly report	10 marks
3.	Viva –voce	20 marks
	Total	40 marks
