| RGPV (DIPLOMA BHOPAL | WING) OCBC CURRICULUM FOR THE FORMAT-3 | 3 Sheet No. 1/3 | |
|-------------------------|--|--|---|
| Branch Mechanical | Engineering Semester V | I | |
| Course Code | Course Name Refrigeration and Air Conditioning | g | |
| Course Outcome 1 | Calculate COP, Refrigeration Effect, Work input for a given Air-refrigeration cycles. | Teach Hrs | Marks |
| Learning Outcome 11 | Describe refrigeration , refrigeration methods | 7 | 10 |
| Contents | Meaning of Refrigeration, Applications of refrigeration, Meth Ice Refrigeration, Evaporative Refrigeration, Refrigeration by I by Throttling of Gas (Vapour), Steam-Jet, Liquid Gas Refrigera Thermo- electric Refrigeration, Magnetic Refrigeration, Solar I refrigeration, Coefficient of performance, Rating of Refr Comparison Of Heat Engine, Refrigerator And Heat Pump | Dry-ice, Ref ation (Nitro Refrigeratio | frigeration ogen, Air), on. Unit of |
| Method of assessment | | | · · · · · · · · · · · · · · · · · · · |
| Learning Outcome 12 | Calculate COP, Refrigeration effect, work input for a given air- refrigeration cycle for a given condition. | 7 | 10 |
| Contents | Cycles used for air-refrigeration systems- Reversed Carnot C Cycle: Processes, their representation on PV and TS diagra Limitations, Calculation of COP, Ref. Effect and work input Heat Pump. | am, Advan | tages and |
| Method of assessment | Part of End Semester Theory Exam (External) | | - |
| Course Outcome 2 | Explain vapour compression, vapour absorption refrigeration system. | Teach Hrs | Marks |
| Learning Outcome 21 | Explain simple vapour compression Refrigeration system. | 7 | 10 |
| Contents | Simple Vapour Compression Refrigeration Cycle, Schema components and its representation on P-h & T-s diagram refrigeration Effect, Work done and Co-efficient of Perfor Compression Refrigeration System (VCRS), Merit and E Compression Refrigeration System over Air Refrigeration System | n, Expre rmance of Demerits o | - |
| Method of assessment | Paper pen / Observation Test (Part of lab work-Internal) | | |
| Learning Outcome 22 | Calculate performance parameters for a vapour compression refrigeration system in a given state. | . 7 | 10 |
| Contents | Dry, Wet, Superheated Compression, Effect Of Sub Cooling a the VCRS, System Performance, Effect of suction and dis Performance of VCRS, Simple Problems for calculating COP, I required in VCRS with the Use Of Refrigeration Charts And Ta | scharge Pro Ref Effect a | essure on |
| Method of assessment | Part of End Semester Theory Exam (External) | | |
| Learning Outcome 23 | Select a suitable method for improving the performance of a given vapour compression refrigeration system. | f 7 | 10 |
| Contents | Improvement in Vapour Compression Refrigeration System - Accumulator, Variation in Evaporator Temperature and Pr Condenser Temperature and Pressure. Actual Vapour Comp | essure, Va | riation in |

| | Cycle and its variations from simple Vapour Compression Refrig | eration Cy | ycle. |
|---|---|---|--|
| | | | |
| Method of assessment | Paper pen test/ quiz (Part of Theory- Internal as Term work) | | |
| Learning Outcome 24 | Explain a Vapour Absorption Refrigeration System. | 7 | 10 |
| Contents | Flow diagram and Operation of Ammonia-Water cycle, Comp VARS ($NH_3 - H_2O$): Absorber, Generator, Analyzer, Re- Evaporator, Heat Exchangers, Pump. Flow diagram and operation of Domestic Electrolux Refrige between Vapour Compression and Vapour Absorption Refrigerat | ctifier, C erator. Co | ondenser, |
| Method of assessment | Part of End Semester Theory Exam (External) | | |
| Course Outcome 3 | Explain construction and working of the basic compo refrigeration system. | nents us | sed in a |
| Learning Outcome 31 | Explain construction and working of Compressor, Condenser, Evaporator. | 7 | 10 |
| Contents | Compressors : Difference between Hermetically sealed of hermetically sealed compressor and open compressor. Working details of reciprocating compressor, screw compressor, centrifuga Condensers : Classification, constructional details and working cooled and evaporative condenser. Evaporators : Classification, constructional details and work forced circulation type evaporators, Plate evaporators, flooded ev | and cons al compres of air coo ting of na | structional ssor. led, water utural and |
| Method of assessment | Part of End Semester Theory Exam (External) | 1 | |
| Learning Outcome 32 | Explain construction and working of a given controlling component of a refrigeration system. | 7 | 10 |
| Contents | Working and constructional details of Capillary tube, Automatic Thermo static Expansion Valve, Float Valve, Solenoid C Evaporator pressure regulator valve. | - | |
| Method of assessment | Part of End Semester Theory Exam (External) | | |
| Course Outcome 4 | Maintain a given refrigeration system | | |
| Learning Outcome 41 | select a suitable refrigerant for a given application | 7 | 10 |
| Contents | Functions, Classification of Refrigerants, Nomenclature of Refri Properties of Ideal Refrigerant, Selection of Refrigerant, Propertie of Commonly Used Refrigerants in Vapor Compression Re Refrigerants and Environmental issues, Ozone Depletion Po Global Warming (GW), Montreal and Kyoto protocols, Total E Index (TEWI), future refrigerants: Alternative refrigerants to R11 | es and Ap frigeration tential (C quivalent | plications n system. DDP) and Warming |
| Method of assessment Learning Outcome 42 | Paper pen / Observation Test (Part of lab work-Internal)Select a suitable refrigeration system for a given | 7 | 10 |
| Sucone 42 | application. | , | 10 |

| Contents | Food Spoilage and Control, Preservation by refrigeration, Slow a Cold Storage and frozen Storage, Dairy refrigeration, Ice Manufa manufacturing, Transport Refrigeration and Cold chain | - | 0 |
|----------------------------------|---|--|---|
| Method of assessment | Paper pen / Observation Test (Part of End Semester Practical Exa | mExter | nal) |
| Learning Outcome 43 | Practice maintenance, servicing and repairing procedures for a given refrigeration system. | 7 | 10 |
| Contents | Tools used in Refrigeration, Tube Cutting, Tube Bending, Tu Swaging, Tube Brazing, Refrigeration System Installation Pr faults in Refrigeration System, Periodic Servicing of Ref Refrigerant charging and Leakage Testing Methods. | ocedure, | Common |
| Method of assessment | Paper pen / Observation Test (Part of End Semester Practical Exa | mExter | nal) |
| Course Outcome 5 | Maintain a given air conditioning system. | | |
| Learning Outcome 51 | Calculate psychometric properties for a given state of air. | 7 | 10 |
| Content | Define psychrometry, Dry air, Moist air, Saturated air, Dry Bulb Bulb Temperature, Dew Point Temperature, Wet Bulb Depre Depression, Partial Pressure of Water Vapour, Specific H humidity, Relative humidity, Degree of saturation, Enthal Calculation of Psychrometric Properties | ession, D lumidity, | ew Point Absolute |
| Method of assessment | Paper-Pen Test/Quiz (Part of Progressive Test-2internal) | | |
| Learning Outcome 52 | Calculate capacities, efficiency of a given air conditioning | 7 | 10 |
| Contents Method of assessment | system component. Basic Psychometric Processes, Sensible Cooling, Sensible Heatin Dehumidification, Cooling and humidification, Cooling and Heating and humidification, Heating and de-humidification. Ac Sensible Heat Factor, By-pass Factor, Capacities and Efficienci equipments, Representation on Psychometric chart. (Simple N Using Psychrometric-chart) Theory exam (External) | de-humidiabatic S diabatic S dies of the | dification, Saturation, coils and |
| Learning Outcome 53 | Explain construction and working of summer, winter and | 7 | 10 |
| Learning Outcome 55 | year round air conditioning systems. | , | 10 |
| Contents | Schematic arrangement & working of Summer, Winter and conditioning system, Window and Split type Air-conditioner, A duct systems. | | |
| Method of assessment | Theory exam (External) | | |
| Learning Outcome 54 | Practice maintenance, servicing and repairing procedures for a given air conditioning system. | 7 | 10 |
| Contents | Air-conditioning Installation Procedure, Faults in Air-conditioning of Air-conditioning, Brief idea about Cooling load estimation. Various Applications of A Residential, offices, Hospitals, commercial buildings Malls etc. | imation a | nd factors |
| Method of assessment | Paper pen / Observation Test (Part of End Semester Practical Exa | mExter | nal) |

| R | GPV (Dig | oloma Win | lg) | SCHEME I | FOR | F | Branch C | Code | Co | urse Code | CO Code | LO Code | |
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| | - | opal | - | ARNING OU | TCOME | M | 0 | 2 | | | 1 | 1 | Format No. 4 |
| COUR | SE NAME | - | and Air Condition | oning | | 1 | | I | | | | | |
| CO De | scription | CO-1 Calcula | te COP, Refriger | ration Effect, Work | input for a give | n Air | -refri | gerat | ion cyc | les. | | | |
| LO Des | scription | LO-11 Describ | e refrigeration, r | efrigeration methods | | | | | | | | | |
| | | | | SCHEM | E OF STUDY | | | | | | | | |
| S. No. | | Learning Con | tent | Teaching – Learning Method | - | | f T-L | | Teac h Hrs. | Pract. /Tut Hrs | 5. | LRs Require | ed Remar |
| 1 | refrigeration Refrigeration Throttling Liquid Gas Thermo- el Refrigeration refrigeration Rating of | , Methods of 1 n, Evaporative n by Dry-ice, of Gas (Vapo Refrigeration ectric Refriger n, Solar Refrig , Coefficient f Refrigeration Of Heat Engin | Applications of refrigeration: Ice Refrigeration, Refrigeration by our), Steam-Jet, (Nitrogen, Air), ation, Magnetic eration. Unit of of performance, on Machines, ne, Refrigerator | method and visuals through handouts, PPTs, Charts and | contents and pro- to students. Tea conduct quiz/ tu /assignment to | Description of T-L Process Teacher will explain the contents and provide handout to students. Teacher will conduct quiz/ tutorials /assignment to make students practice their learning. | | | | | Cl | andouts, narts, ideos | NIL |
| | | | | SCHEME O | F ASSESSME | NT | | | | | | | |
| S. No. | Method of | fAssessment | I | Description of Asse | essment | | I | Maxi Ma | mum rks | Resourc | es Re | equired | External Internal |
| 1 | Paper-Pen To of Progressiv | est/Quiz (Part ve Test-1) | | be asked to explain given terms associated with and its methods . | | | 10 | | Test Paper | | | Internal | |
| | | | ADDITIONAL | INSTRUCTIONS | FOR THE HO |)D/ F | ACU | LTY | (IF A | NY) | | | |
| | | | | Part of Pr | ogressive Test | 1 | | | | | | | |

| R | GPV (Diplo | ma Win | g) | SCHEME | FOR |] | Branch C | Code | Cou | urse Code | CO Code | LO Code | | 4 | |
|--------------|-------------------------------------|--|--|--|---|--|--------------|-------|-------------------|------------------------|------------------------------|------------------------------|----------|----------------------|--|
| | Bhop | | - | RNING OU | TCOME | M | 0 | 2 | | | 1 | 2 | Forn | nat No. 4 | |
| | IIRSE | | l Air Conditioning | 5 | | | | | | I | 1 | 1 | 1 | | |
| CO Descri | ption CO-1 | Calculate CO | OP, Refrigeration E | ffect and Work inp | out for Air-refrig | eratio | n cycle | è. | | | | | | | |
| LO Descri | ption LO-12 | 2 Calculate C | COP, Refrigeration | effect, work input | for a given air- r | efrige | ration | cycle | for a gi | ven condit | ion. | | | | |
| | | | | SCHEM | E OF STUDY | | | | | | | | | | |
| S. No. | Lea | rning Con | tent | Teaching – Learning Method | Descripti Pro | ion of cess | ſ T-L | | Teac h Hrs. | Pract. /Tut Hrs. | F | LRs Requir | | Remark s | |
| 1 | Processes, their r diagram, Adva | Cycle, Bell- representatio antages an OP, Ref. Effe | - Coleman Cycle: on on PV and TS nd Limitations, ect and work input | Interactive lecture method and visuals through handouts, PPTs, Charts and Videos. | contents and p to students. To conduct quiz/ to /assignment to | Teacher will explain the contents and provide handout to students. Teacher will conduct quiz/ tutorials /assignment to make students practice their learning. | | | | _ | | Handouts, Charts, Videos, | | | |
| | | | | SCHEME (|) F ASSESSME | NT | | I | | | | | | | |
| S. No. | Method of As | sessment | | Description of | Assessment | | | | Max m M | | Resoui Requi | | | xternal / nternal | |
| 1 | Theory Exam | | | e asked to calculate COP, Refrigeration effect, work en air- refrigeration cycle for a given condition. | | | | k | 1 | | Test paper + Rating Scale | | External | | |
| | | A | ADDITIONAL IN | NSTRUCTIONS | FOR THE HO |)D/ F | FACU | LTY | (IF Al | NY) | | | | | |
| | | | | Part of end Se | mester theory | Exar | n | | | | | | | | |
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|] | RGPV (| Diploma Wir | ng) | SCHE | ME FOR | | Branch (| Code | Course Code | CO Code | | 4 |
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| | × × | Bhopal | 0 / | LEARNING | GOUTCOME | M | 0 | 2 | | 2 | 1 | Format No. 4 |
| | OURSE | Refrigeration an | d Air Co | nditioning | | | | | | I | | |
| CO Desc | cription | CO-2: Explain va | pour com | pression, vapour absor | ption refrigeration syster | n. | | | | | | |
| LO Desc | ription | LO-21: Explain s | imple vap | our compression Refri | geration system. | | | | | | | |
| | | | | S | CHEME OF STUDY | | | | | | | |
| S. No | L | earning Content | | Teaching – Learning Method | Description of T-L | Pro | cess | Teach Hrs. | Pract. /Tut Hrs | . R | LRs equired | Remarks |
| 1 | representati Expression Work dor Performanc Refrigeration | on Cycle, S at of components on on P-h & T-s for refrigeration ne and Co-effic e of Vapour Con on System (VCRS rits of Vapour Con on System over | diagram, Effect, ient of npression), Merit npression | Interactive lecture method and visuals through handouts, PPTs, Charts and Videos. | eractive lectureTeacher will explain the contents1ethod and visualsand provide handout to students.1ough handouts,Teacher will conduct quiz/1Ts, Charts andtutorials /assignment to make1 | | | | | Har Cha Vid | · · | NIL |
| | | | | SCHI | EME OF ASSESSME | NT | | 1 | | I | | I |
| S. N | o. Metho | od of Assessment | | Descrij | ption of Assessment | | | | Maximu m Marks | | esource equired | |
| 1 | T | pen / Observation Yest (Practical Component) | compres (b) draw | sion refrigeration syste | plain working of a given em by drawing P-h,T-s d nt of a given vapour com | iagra | ms. | | 10 | Obs Sch Che | t paper/ ervation edule/ eck list/ ing Scale | |
| | | | ADDITI | ONAL INSTRUCT | TIONS FOR THE HO | D/F | FACU | LTY (IF | TANY) | | | |
| | | | | | (Part of Lab work) | | | | | | | |

| R | GPV (Di | iploma Wing) | SCHE | EME FOR | | E | Branch C | ode | Cour | se Code | CO Code | LO Code | | 4 |
|-------------|--|--|---|---|--|---|--|--------------------------|-----------|-----------------|------------------------|----------------------|-------------|----------------------|
| | | hopal | LEARNIN | G OUTCO | ME | M | 0 | 2 | | | 2 | 2 | Forma | at No. 4 |
| | MIRSE | Refrigeration and Air Co | onditioning | | | 1 | | | I | I | | | | |
| CO Descr | iption | CO-2: Explain vapour con | pression, vapour abso | orption refrigeration | on syster | m. | | | | | | | | |
| LO Descr | iption | LO-22:Calculate performa | nce parameters for a | vapour compressi | on refrig | eratio | on sys | tem in a | a given | state. | | | | |
| | | | S | SCHEME OF S | TUDY | | | | | | | | | |
| S.N o | | Learning Conter | t | Teaching – Learning Method | Des | - | ion o ocess | f T-L | Tea Hi | ach rs | Pract. /Tut Hrs. | | Rs uired | Remar k |
| 1 | Cooling an Performance Performance COP, Ref E | Superheated Compression d Super Heating on t e, Effect of suction and di e of VCRS, Simple Prob Effect and Power required igeration Charts And Tabl | he VCRS, System scharge Pressure on ems for calculating in VCRS with the | Interactive lecture method and visuals through handouts, PPTs, Charts and Videos. | Teache conten handou Teache quiz/ tu /assign studen learnin | ts and at to ser wil atoria ment ts pra | d prov studen l cond ils to ma | ide ts. uct ike | 7 | | - | Hand Char Vide | , | |
| | | | SCH | EME OF ASSE | ESSME | NT | | | | | | | | |
| S. No | . Method Assessm | | Descriptio | on of Assessmen | nt | | | | | laximu Marks | | source quirec | | xternal / nternal |
| 1 | Theory E | | ked to calculate given geration system in a g | 1 I | ameters | for a | vapou | r | | 10 | | paper + g Scale | | ternal |
| | | ADDIT | IONAL INSTRUC | TIONS FOR T | HE HO | D/ F | ACU | LTY (| IF AN | Y) | | | I | |
| | | | Part o | of end semester t | heory ex | kam | | | | | | | | |

| RGPV (I | Diplo | ma Wing) | SC | CHEME FOR | ł | В | ranch C | ode | Course | | | LO Code | 1 |
|---|--|---|---|--|--|--|--|--|---|--|---|---|---|
| | _ | - | LEAR | NING OUTC | OME | M | 0 | 2 | | | 2 | 3 Forr | nat No. 4 |
| OURSE | | | nditioning | | | 1 | 1 | | I | | | | |
| cription | CO-2: | Explain vapour com | pression, vapou | ar absorption refriger | ation syste | m. | | | | | | | |
| cription | LO-23 | B Select a suitable me | ethod for impro | ving the performance | e of a given | i vapo | ur cor | npressi | ion refrig | geration sys | tem. | | |
| | | | | SCHEME OF | STUDY | | | | | | | | |
| | Le | arning Content | | Teaching – Learning Method | | - | | Ր -Լ | | | | LRs Required | Reman |
| System - by in Evaporate Condenser T Compression | 7 Flash or Temp Cempera n Refrig | Chamber, Accumula berature and Pressure ture and Pressure. A geration Cycle and | tor, Variation e, Variation in Actual Vapour its variations | Interactive lecture method and visuals through handouts, PPTs, Charts and Videos. | contents a handout to Teacher v tutorials / | and pro o stud vill co assign | ovide ents. nduct ment | quiz/ to | 7 | - | | Handouts, Charts, Videos | |
| | | | | SCHEME OF AS | SESSME | NT | | | | | | | |
| 0 | | | Des | cription of Assess | ment | | | | | Maximu m Marks | | | Externa / Internal |
| | | | | | nproving th | e perf | formai | nce of a | a | 10 | T | est Paper | Internal |
| | | ADDITI | ONAL INST | RUCTIONS FOR | THE HO | D/ F . | ACU | LTY (| IF ANY | <i>Z</i>) | | | |
| | | | | Part of Terr | n work | | | | | | | | |
| | | | | | | | | | | | | | |
| | Course NAME Cription Cription Cription Improvement System - by in Evaporate Condenser T Compression from simpl Cycle. | Bhop OURSE Refrig NAME CO-2: Cription LO-23 Cription LO-23 Improvement in Va System - by Flash in Evaporator Temp Condenser Tempera Compression Refrig from simple Vap Cycle. | NAME Refrigeration and Air Content cription CO-2: Explain vapour composition cription LO-23 Select a suitable method Improvement in Vapour Compression System - by Flash Chamber, Accumulation in Evaporator Temperature and Pressure Accompression Condenser Temperature and Pressure Accompression Compression Refrigeration Cycle and from simple Vapour Compression Cycle. compression Paper pentopen Paper pentopen Student will be asked given vapour composition | Bhopal LEARN COURSE NAME Refrigeration and Air Conditioning COURSE NAME Refrigeration and Air Conditioning COURSE NAME Refrigeration and Air Conditioning CO-2: Explain vapour compression, vapour CO-2: Explain vapour compression, vapour LO-23 Select a suitable method for impro Eription LO-23 Select a suitable method for impro Eription Lo-23 Select a suitable method for impro Eription Learning Content Improvement in Vapour Compression Refrigeration System - by Flash Chamber, Accumulator, Variation in Condenser Temperature and Pressure. Actual Vapour Compression Refrigeration Cycle and its variations from simple Vapour Compression Refrigeration Cycle. Go. Method of Assessment Dessection Paper pen test/ quiz Student will be asked to select a s given vapour compression refriger | Bhopal LEARNING OUTC OURSE NAME Refrigeration and Air Conditioning Refrigeration and Air Conditioning CO-2: Explain vapour compression, vapour absorption refriger eription LO-23 Select a suitable method for improving the performance Bropal LO-23 Select a suitable method for improving the performance Eription LO-23 Select a suitable method for improving the performance Improvement in Vapour Compression Refrigeration Teaching – Learning Method Improvement in Vapour Compression Refrigeration System - by Flash Chamber, Accumulator, Variation in Evaporator Temperature and Pressure. Actual Vapour Compression Refrigeration Cycle and its variations from simple Vapour Compression Refrigeration Cycle. Interactive lecture method and visuals through handouts, PPTs, Charts and Videos. Fo. Method of Assessment Description of Assess Paper pen test/ quiz Student will be asked to select a suitable method for in given vapour compression refrigeration system. ADDITIONAL INSTRUCTIONS FOR | Bhopal LEARNING OUTCOME OURSE NAME Refrigeration and Air Conditioning Refrigeration and Air Conditioning CO-2: Explain vapour compression, vapour absorption refrigeration syste cription CO-2: Explain vapour compression, vapour absorption refrigeration syste cription LO-23 Select a suitable method for improving the performance of a given scription Lo-23 Select a suitable method for improving the performance of a given scription Learning Content Teaching – Learning Method Description Improvement in Vapour Compression Refrigeration in Evaporator Temperature and Pressure. Actual Vapour Compression Refrigeration Cycle and its variations from simple Vapour Compression Refrigeration Cycele. Interactive lecture method and visuals through handouts, PPTs, Charts and Videos. Teacher v contents a handout the reacher v tutorials A make stud learning. fo. Method of Assessment Description of Assessment Paper pen test/ quiz Student will be asked to select a suitable method for improving th given vapour compression refrigeration system. | Bhopal LEARNING OUTCOME M OURSE NAME Refrigeration and Air Conditioning CO-2: Explain vapour combiner c | Bhopal LEARNING OUTCOME M 0 OURSE NAME Refrigeration and Air Conditioning cription CO-2: Explain vapour compression, vapour absorption refrigeration system LO-23 Select a suitable method for improving the performance of a given vapour compression Refrigeration SCHEME OF STUDY Improvement in Vapour Compression Refrigeration in Evaporator Temperature and Pressure, Variation in Condenser Temperature and Pressure, Variation in Condenser Temperature and Pressure, Variation in Condenser Temperature and Pressure, Actual Vapour Compression Refrigeration Cycle and its variations from simple Vapour Compression Refrigeration Cycle and its variations from simple Vapour Compression Refrigeration Cycle and its variations from simple Vapour Compression Refrigeration Refrigeration of Assessment Scheme of Assessment Teacher will conduct utorials /assignment make students practic learning. o. Method of Assessment Student will be asked to select a suitable method for improving the performance is system. LO-2000 Assessment ADDITIONAL INSTRUCTIONS FOR THE HOJ/FACURE ADDITIONAL INSTRUCTIONS FOR THE HOJ/FACURE | Bhopal LEARNING OUTCOME M 0 2 OURSE NAME Refrigeration and Air Conditioning CO-2: Explain vapour compression, vapour absorption refrigeration system. cription LO-23 Select a suitable method for improving the performance of a given vapour compression SCHEME OF STUDY Veription LO-23 Select a suitable method for improving the performance of a given vapour compression Paching - Learning Method Description of T-L Process Improvement in Vapour Compression Refrigeration in Evaporator Temperature and Pressure, Variation in Evaporator Temperature and Pressure. Actual Vapour Compression Refrigeration Cycle and its variations from simple Vapour Compression Refrigeration Cycle. Interactive lecture method and visuals through handout, PPTs, Charts and Videos. Teacher will explain the contents and provide handout to students. Teacher will conduct quiz/ Charts and Videos. videos. SCHEME OF ASSESSMENT videos. Student will be asked to select a suitable method for improving the performance of a given vapour compression refrigeration system. Paper pen test/ quiz Student will be asked to select a suitable method for improving the performance of a given vapour compression refrigeration system. | Bhopal LEARNING OUTCOME M 0 2 OURSE NAME Refrigeration and Air Conditioning CO-2: Explain vapour compression, vapour absorption refrigeration system. cription CO-2: Explain vapour compression, vapour absorption refrigeration system. LO-23 Select a suitable method for improving the performance of a given vapour compression refrigeration SCHEME OF STUDY Improvement in Vapour Compression Refrigeration in Evaporator Temperature and Pressure, Variation in Evaporator Temperature and Pressure, Variation in Condenser Temperature and Pressure, Variation in Condenser Temperature and Pressure, Actual Vapour Compression Refrigeration Cycle and its variations from simple Vapour Compression Refrigeration System - by Flash Chamber, Accumulator, Variation in Condenser Temperature and Pressure, Variation in Condenser Temperature and Pressure, Actual Vapour Compression Refrigeration Cycle and its variations from simple Vapour Compression Refrigeration System - by or Compression Refrigeration System. Teacher will explain the contents and provide handout to students. Teacher will conduct quiz/ tutorials /assignment to make students practice their learning. 7 of Method of Assessment Description of Assessment 8 10 of Assessment Student will be asked to select a suitable method for improving the performance of a given vapour compression refrigeration system. 8 10 Ourse Student will be asked to select a suitable method for improving the performance of a given vapour compression refrigeration system. 10 | KCFV (Diploma Wing) Bhopal SCHEME FOR LEARNING OUTCOME Image Code Course Code </td <td>Bhopal LEARNING OUTCOME M 0 2 0 2 OURSE NAME Refrigeration and Air Conditioning CO-2: Explain vapour compression, vapour absorption refrigeration system. CO-2: Explain vapour compression, vapour absorption refrigeration system. Vapour compression refrigeration system. Co-2: Explain vapour compression, vapour absorption refrigeration system. Description of T-L Process Teach Nethod Description of T-L Process Teach Hrs. Pract. /Tut Hrs. Improvement in Vapour Compression Refrigeration System - by Flash Chamber, Accumulator, Variation in Evaporator Temperature and Pressure, Variation from simple Vapour Compression Refrigeration Condenser Temperature and Pressure, Variation from simple Vapour Compression Refrigeration from simple Vapour Compression refrigeration f</td> <td>Brance Code Code</td> | Bhopal LEARNING OUTCOME M 0 2 0 2 OURSE NAME Refrigeration and Air Conditioning CO-2: Explain vapour compression, vapour absorption refrigeration system. CO-2: Explain vapour compression, vapour absorption refrigeration system. Vapour compression refrigeration system. Co-2: Explain vapour compression, vapour absorption refrigeration system. Description of T-L Process Teach Nethod Description of T-L Process Teach Hrs. Pract. /Tut Hrs. Improvement in Vapour Compression Refrigeration System - by Flash Chamber, Accumulator, Variation in Evaporator Temperature and Pressure, Variation from simple Vapour Compression Refrigeration Condenser Temperature and Pressure, Variation from simple Vapour Compression Refrigeration from simple Vapour Compression refrigeration f | Brance Code |

| | GFV (D | iplon | na Wing) | SCHEM | IE FOR |] | Branch Co | ode | Course C | | CO Code | LO Code | Α |
|-------------|---|---|---|---|---|--|--|------------------------------------|-----------------|----------------|------------|-----------------|------------------------|
| | | hopa | _ | LEARNING | OUTCOM | E M | 0 | 2 | | | 2 | 4 | Format No. 4 |
| | DURSE | - | eration and Air Co | nditioning | | 1 | | | I | 11 | | | |
| CO Descr | ription | CO-2: I | Explain vapour com | pression, vapour absorpt | tion refrigeration s | ystem. | | | | | | | |
| LO Descr | ription | LO-24 | Explain a Vapour A | Absorption Refrigeration | System. | | | | | | | | |
| | | | | SC | HEME OF STU | DY | | | | | | | |
| S. No. | | | Learning Conte | nt | Teaching – Learning Method | Descrij P | ption o Process | | Teach Hrs. | Prac /Tut I | | LF Requ | Romarl |
| 1 | Components Generator, A Exchangers, Flow diagra Refrigerator. | of Pra Analyzer Pump. am an Compa | actical VARS (NH r, Rectifier, Conder id operation of | mmonia-Water cycle, $I_3 - H_2O$): Absorber, nser, Evaporator, Heat Domestic Electrolux pour Compression and n. | Interactive lecture method and visuals through handouts, PPTs, Charts and Videos. | Teacher the cont provide students will con tutorials to make practice learning | ents an handou . Teac duct qu /assign studen their | d it to her iiz/ nment | 7 | | - | | outs, s, |
| | | | | SCHE | EME OF ASSESSN | IENT | | | | | | | |
| S. No | Metho Assessn | | | Description of | Assessment | | | | Maximu Marks | | | ources uired | External / Internal |
| 1 | Theory E | xam | Student will be asl refrigeration syste | ked to explain working o m. | f a given vapour | absorption | n | | 10 | | - | aper + Scale | External |
| | | | ADDIT | IONAL INSTRUCTI | ONS FOR THE | HOD/ I | FACU | LTY (| IF ANY) | | | | |
| | | | | Part of e | end semester theo | ry exam | | | | | | | |

| | | | | | | Branch Code | | | | C | Course C | rse Code CO Code | | LO Code | | |
|---------|--|--|---|---|---|---|--|---|------------------------|-------|---------------|---------------------|-----------------|----------------------|-----------------------|------------------------|
| R | · · · | iplom hopal | na Wing) I | | EME FOR NG OUTCOME | E 1 | M | 0 | 2 | | | | 3 | 1 | _ | nat No. 4 |
| COURS | | _ | geration and Air Cor | nditioning | | | | | | | | | | | 1 | |
| CO Dese | scription | CO-3 J | Explain construction | and working of the | basic components used | l in a r | refri | gerati | ion sy | stem. | | | | | | |
| LO Deso | cription | LO-31 | Explain constructior | n and working of Co | ompressor, Condenser, H | Evapo | orato | or. | | | | | | | | |
| | | | | S | CHEME OF STUDY | Ŷ | | | | | | | | | | |
| S. No | |] | Learning Content | | Teaching – Learning Method | | - | ption Proces | | | each Irs. | | ract. t Hrs. | | L Rs quired | Remar k |
| | compressor, open compre- reciprocating compressor. Condensers working of a condenser. Evaporators working of n | , semi- h ressor. W ng compro s: Classi air coole rs : Clas natural a | ference between Herm hermetically sealed co Working and construct ressor, screw compressification, construction ed, water cooled and of assification, construction and forced circulation flooded evaporators. | compressor and ctional details of essor, centrifugal onal details and evaporative tional details and | Interactive lecture method and visuals through handouts, PPTs, Charts and Videos. | expla and p hand Teach cond tutor /assig make pract | l prov ndout acher nduct orials signm ke stu | the convide vide t to stu c will t quiz/ s nent to udents e their | udents. ⁄ o s | S | 7 | | - | Hand Char Vide | · · | |
| | | | | SCHF | EME OF ASSESSMI | ENT | ſ | | | | | | | | | |
| S. No. | Metho Assessr | | | Description | n of Assessment | | | | | | laxim Marl | | | source quireo | | External / Internal |
| 1 | Theory E | Exam | Student will be ask Compressor/Conde | | construction/working of given | | | | 10 Test | | | | - | | External | |
| | | | ADDITIO |)NAL INSTRUCI | FIONS FOR THE H | i OD / | / FA | CUL | .TY (| IF AI | NY) | | | | | |
| | | | | Part of J | End Semester Theor | ry exa | am | | | | | | | | | |

| ŀ | RGPV (D | iplor | ma Wing) | | SCHEME I | FOR | Branch | Code | Course Code | CO Code | LO Code | Form | nat No. 4 |
|-----------|-------------------------------|-------------------------|---|----------------------|-------------------------------------|----------------------------|---|--------------------------|----------------|--------------------------------|---|------|----------------------|
| | B | Bhopa | al | LJ | EARNING OU | JTCOME | M 0 | 2 | | 3 | 2 | Form | iat ino. 🕇 |
| COUJ | RSE NAME | Refri | igeration and Air Co | onditio | ning | | | · | | · | | | |
| CO De | escription | CO-3 | Explain construction | n and we | orking of the basic com | nponents used in | a refrigera | ation sys | stem. | | | | |
| LO De | escription | LO-3′ | 2 Explain construction | on and v | working of a given cont | trolling compone | nt of a ref | rigeratic | on system. | | | | |
| | | | | | SCHEMF | E OF STUDY | | | | | | | |
| S. No. | | Learn | ning Content | | T-L Method | Description Process | | Teac Hrs. | ///// | LR | Rs Requir | red | Remark |
| | tube, Automat Expansion Va | atic Expa 'alve, Flo | ructional details of Ca pansion Valve, Thermo loat Valve, Solenoid (r pressure regulator valv | no static Control | method and visuals | handout to Teacher will | provide students. conduct tutorials to make | 7 | - | Vide Expe setuj refri | ndouts, Cha eos, perimental up for igerator /ho ine/Heat p | neat | |
| | | | | | SCHEME OJ | F ASSESSMEN | √T | | | | | | |
| S. No | o. Metho Assessi | | | | Description of Ass | sessment | | | Maxi m Ma | | Resource Require | | External Internal |
| 1 | Theory e | exam | Student will be a component of a ref | | to explain the constr on system. | olling 10 | | Test paper Rating Sca | | External | | | |
| | I | | | ONAL | INSTRUCTIONS F | FOR THE HO! | D/ FACU | J LTY (' | IF ANY) | I | | | |
| | | | | | Part of end Sem | mostor theory Fr | | | | | | | |

| R | GPV (Dinla | oma Wing) | | CHEME FOR | Br | anch | Code | Course Code | CO Code | LO Code | | _ |
|-----------|--|--|--|---|---|--|--------------------------------------|--|------------------------|--------------------------------|--|----------|
| | Bhop | 0, | | LEARNING DUTCOME | M | 0 | 2 | | 4 | 1 | Format No. 4 | |
| CO | URSE NAME | Refrigeration and | l Air Condit | ioning | I | 1 | | I | 1 | | 1 | |
| COI | Description | CO-4 Maintain a | given refrig | eration system | | | | | | | | |
| LOI | Description | LO-41 select a sui | table refrige | erant for a given app | lication | | | | | | | |
| | | 1 | | SCHEME | OF STUDY | Y | | | | | | |
| S. No. | Le | earning Content | | Teaching – Learning Method | Descrip Pi | tion (| | Teach Hrs. | Pract. /Tut Hrs. | LRs R | equired | Remark |
| | Nomenclature of of Ideal Refrige Properties and A Refrigerants in V system. Refriger Ozone Depletion Warming (GW), Total Equivalent | assification of I Refrigerants, Desirable erant, Selection of Applications of Common Vapor Compression F ants and Environme and Environme Potential (ODP) Montreal and Kyote Warming Index (TE rnative refrigerants to | Refrigerant, monly Used Refrigeration ental issues, and Global o protocols, EWI), future | Interactive lecture method and visuals through handouts, PPTs, Charts and Videos. | Teacher wil contents an handout to Teacher wil tutorials /as make stude their learnin | d prov studer Il cond signm nts pra 1g. | vide nts. duct quiz nent to | 3 | 4 | Charts, Experir setup fo | Handouts, Charts, Videos, Experimental etup for Iryness fraction | |
| S. | Method of | | | SCHEME OF | | ENI | | Maxim | u Re | esources | Ex | ternal / |
| No. | Assessment | | Desc | ription of Assessme | ent | | | m Marl | ks R | equired | Iı | nternal |
| 1 | Paper pen / Observation Test (Practical Component) | et a suitable refrigeran | t for a given a | applic | ation. | 10 | Obse Sche Chec | t paper/ ervation edule/ ck list/ ng Scale | I | nternal | | |
| | | ADDI | TIONAL I | NSTRUCTIONS F | OR THE H | OD/ | FACUI | LTY (IF A | NY) | | | |
| | | | | (Part of | Lab work) | | | | | | | |

| RGPV(Diploma Wing) Bhopal | | | FOR LEAR | NING | Bra | anch (| Code | C | ourse (| Code | CO Code | LO Code | Format No. | |
|-------------------------------|--|--|--|--------------|----------|-------------|---------|---------------|--|-------------------------------|---|------------|----------------------|--|
| vv | ing) bhopai | OUTCOME | | | | 0 | 2 | | | | 4 | 2 | 4 | |
| C | OURSE NAME | | | | | .1 | | 1 | | I | | | | |
| CO De | escription | CO-4 Maintain a g | iven refrigeration s | ystem | | | | | | | | | | |
| LO De | scription | LO-42 Select a suit | able refrigeration s | ystem for a | given | applic | cation. | | | | | | | |
| | | | SCHE | ME OF ST | UDY | | | | | | | | | |
| S. No. | Learning | Teaching – Learning Method | Descript | on of | T-L P | Process | 5 | Teacl Hrs. | | Pract. LR: /Tut Hrs. Requi | | ed Remar | | |
| | Food Spoilage and C by refrigeration, Slow Cold Storage and fro refrigeration, Ice Manu manufacturing, Tran and Cold chain. | Interactive Classroom method, Handout PPTs, Charts and Videos, Models | Teacher will explain the contents1and provide handout to students.Experimental determination of dryness fraction. | | | | | | | 6 | Handout Charts, Videos, Experim ntal setu for dryness fraction | e | | |
| | | | SCHEME | OF ASSES | SSME | NT | | • | | | | | | |
| S. No. | Method of Assessm | ent De | scription of Asses | sment | | N | Aaxim | um N | Marks | | Resou Requi | | External Internal | |
| 1 | Paper pen / Observatio Test (Practical Component) | asked to select a su tem for a given appli | suitable refrigeration 10 pplication. | | | | | S | Test pa Observ Schedule/ C Rating S | ation Theck list/ | External | | | |
| | | ADDITIONAL | L INSTRUCTION | IS FOR TH | IE HC | D/ F | ACUL | LTY (| (IF AN | IY) | U | | | |
| | | | (Part of End S | Semester Pra | ctical I | Exam) | | | | | | | | |
| | | | | | | , | | | | | | | | |

| RGPV (Diploma Wing) | | | SCHEME FOR LEARNING | | | Branch Code Cour | | | | CO Code | LO Code | _ | | | |
|--|--|------------------------------|--|---|---|---|--|-------------------------|---|-----------------|---------------------------------|------------------|------------------------|--|--|
| | Bhopal | | | M | 0 | 2 | | | 4 | 3 | Forn | nat No. 4 | | | |
| | COURSE NAME | | Refrigeration | efrigeration and Air Conditioning | | | | | | | | | | | |
| CO Description CO-4 Maintain a given refrigeration system | | | | | | | | | | | | | | | |
| LOI | Description | | LO-43 Pract | ce maintenance, servicin | g and 1 | repair | ing pr | ocedur | es for a giv | ven refrige | eration s | system | l . | | |
| | | | | SCHEME OF | STUD | Y | | | | | | | | | |
| S. No. | Learning | Teaching –Learning Method | De | - | tion of ocess | T-L | Teach Hrs. | Pract . /Tut Hrs. | Ll Requ | | Remarl | | | | |
| Tools used in Refrigeration, Tube Cutting, Tube Bending, Tube Flaring, Tube Swaging, Tube Brazing, Refrigeration System Installation Procedure, Common faults in Refrigeration System, Periodic Servicing of Refrigeration system. Refrigerant charging and Leakage Testing Methods. | | | | Interactive Classroom method, Handout, PPTs, Charts and Videos. Models of boilers, mountings and accessories | conte hando Teach Quiz/ stude | ents and out to a her will visit t | ll expla d provi student ll condu to make actice th | de s. uct e | 1 | 6 | Handouts, Charts, Videos, | | | | |
| | | | | SCHEME OF ASS | ESSM | IENT | | | | | | | | | |
| S. No. | Method of Assessment | | Descr | ption of Assessment | | | Max | ximum | n Marks | | urces uired | | External / Internal | | |
| 1 | Paper pen / Observation Test (Practical Component) | | to supervise maintenance/servicing refrigeration system/component. | | | 10 | | | Test Observat Schedule list/ Ratin | ion e/ Check | | External | | | |
| | | ADD | DITIONAL IN | STRUCTIONS FOR | гне н | HOD/ | FACU | JLTY | (IF ANY) |) | | | | | |
| | | | | (Part of End Semester 1 | Practics | al Exa | m) | | | | | | | | |

| RC | GPV (Dip | oloma Wi | ng) | SCHE | ME FOR | | Bı | anch C | ode | | Course Cod | e | CO Code | LO Code | | 1 |
|--------|--|---|--|---|--|--|--|--|--|-------------|-------------------|----|---------------------|------------------------------|------------------------------|-----------------------|
| | _ | opal | U / | LEARNING | GOUTCOM | \mathbf{E} | M | 0 | 2 | | | | 5 | 1 | Form | at No. 4 |
| COUR | SE NAME | | n and Air | Conditioning | | | | | | | | | | | | |
| CO De | scription | CO-5 Maint | tain a giv | en air conditioning s | ystem. | | | | | | | | | | | |
| LO De | scription | LO-51 Calcu | late psych | ometric properties for | r a given state of air | r. | | | | | | | | | | |
| | | | | SC | CHEME OF STU | DY | | | | | | | | | | |
| S. No. | | Learnin | ng Conte | nt | Teaching – Learning Method | Dese | - | tion coces | of T- s | L | Teac h Hrs. | /] | act. Fut Frs. | | Rs _l uire d | Remar k |
| 1 | Dry Bulb Point Temp Depression, Humidity, Degree of sa | Temperature, V erature, Wet I Partial Pressu Absolute hu | Wet Bulb Bulb Dep re of Wat midity, I alpy of mo | st air, Saturated air, Temperature, Dew ression, Dew Point ter Vapour, Specific Relative humidity, pist Air. Calculation | Interactive Classroom method, Handout, PPTs, Charts and Videos. | Teach the co provi- stude condu make their | onte de h ents. uct (e stud | nts ar ando Teacl Quiz/v dents | nd ut to her wi visit t practi | ill to | 7 | | - | Hanc Char Vide mode | os, | |
| | 1 | | | SCHE | ME OF ASSESS | SMEN | Т | | | | | | | | | 1 |
| S. No. | Method of | Assessment | | Descrip | tion of Assessme | nt | | | | | Maximu n Mark | | | ources uired | | xternal / Internal |
| 1 | Paper-Pen T of Progressiv | est/Quiz (Part ve Test-2) | | will be asked to (a) de late given psychomet | U 1 I | - | | | | | 10 | Т | est Pa | per | In | ternal |
| | | A | ADDITI(| ONAL INSTRUCT | IONS FOR THE | E HOD |)/ F. | ACU | LTY | (IF | ANY) | | | | | |
| | | | | Par | t of Progressive T | Fest 2 | | | | | | | | | | |

| RC | GPV (Dipl | oma Win | ig) | SCHE | EME FOR | | Branch | Code | Cou | se Code | CO Code | LO Code | | A | |
|---------------|--|---|--|--------------------------------------|--|--|----------------|-----------------|------------|------------------------------|------------------------|------------------|------------------|-----------------------|--|
| | Bho | | U / | LEARNING OUTCOME $M = \theta$ | | | | | | | 5 | 2 | Form | Format No. 4 | |
| | IRSE | • | d Air Condition | ing | | | | I | 11 | | 1 | 11 | | | |
| CO Descriț | ption CO | -5 Maintain a | a given air cond | itioning sys | tem | | | | | | | | | | |
| LO Descrip | ption LO- | -52 Calculate | capacities, effic | iency of a g | iven air conditioning s | syste | em com | ponent. | | | | | | | |
| | | | | S | SCHEME OF STUD | Y | | | | | | | | | |
| S. No. | | Learning | Content | | Teaching – Learning Method | De | scripti Pro | on of T cess | -L | 'ea ch [rs. | Pract. /Tut Hrs. | Rec | Rs quire d | Remar k | |
| 1 | Basic Psycho Sensible Hear Cooling and humidification and de-humid Heat Factor Efficiencies Representation Numerical Pro | dification, and de- n, Heating n, Sensible ities and quipments, (Simple | Interactive Classroom method, Handout, PPTs, Charts and Videos. | the pro- stuc con mak | content vide har lents. To duct Qu | ndout to eacher w hiz/visit nts pract | vill to | 7 | - | Hand Char Vide mode | eos, | | | | |
| | | | | SCH | EME OF ASSESSM | IEN | Т | | | | | | | | |
| S. No. | Method of A | ssessment | | Descrij | otion of Assessment | | | | Maxi Ma | mum rks | | ources Juired | | xternal / [nternal | |
| 1 | Theory exam | L | | acity/efficie | describe a given psycho ency of a given air cond tric chart. | | - | | 1 | 0 | Test p Rating | aper + Scale | | External | |
| | <u> </u> | Α | DDITIONAL | INSTRUC | TIONS FOR THE H | IOI |)/ FAC | ULTY | (IF Al | NY) | | | | | |
| | | | | Part | of end semester theory | v exa | ım | | | | | | | | |

| RGPV (Diploma Wing) | | | | SCHEME FOR | ł | | Branc | h Code | | Cours | e Code | CO Code | LO Code | | | |
|-----------------------------|------------------------|--|------------------------------|--|--|---------------|-------|-------------|---------------|---------------|-----------|------------|-------------------------------------|--------|----------------------|--|
| | · • | opal | · | CARNING OUTCOME | | | 1 |) | 2 | | | 5 | | Forn | rmat No. 4 | |
| COU | RSE NAME | Refrigeration a | nd Air Condi | tioning | | | | | | I | I | | | | | |
| CO De | scription | CO-5 Maintain | a given air co | onditioning system | | | | | | | | | | | | |
| LO Des | scription | LO-53 Explain | construction | and working of summer, | winter and | l ye | ar ro | ind a | nir co | nditior | ning syst | ems. | | | | |
| | | | | SCHEME OF | STUDY | | | | | | | | | | | |
| S. No. | L | earning Conten | Teaching –Learning Method | Descri | - | on of cess | T-L | 1 | Teach Hrs. | Pra /Tut] | | Ll Requ | | Remark | | |
| | Summer, W conditioning | arrangement & inter and Year system, Window ditioner, Air-distr | round Air- and Split | Interactive Classroom method, Handout PPTs, Charts and Videos. | Teacher will explain the contents and provide handout to students. Teacher will conduct Quiz/visit to make students practice their knowledge | | | | | 5 | | | Hando Charts Videos models | | | |
| | | | | SCHEME OF AS | SESSME | NT | | | | | | | | | | |
| S. No. | Metho | | Descr | iption of Assessment | | | | xim Iark | | Re | sources | s Req | uired | | xternal / nternal | |
| 1 | Theory Exar | | ng of summer/ | d to explain construction a winter/year round air cond | | | | 10 | | | Test | Paper | | Exter | rnal | |
| | 1 | AD | DITIONAL | INSTRUCTIONS FOR | THE HO | D/ | FAC | UL | Г Ү (І | FAN | Y) | | | | | |
| | | | | Part of end semeste | er theory ex | xan | 1 | | | | | | | | | |

| | | | | | SCHEME FOR | SCHEME FOR Branch Code | | | | Course | rse Code C | | LO Code | | |
|--|---|------------|----------------|--|--|--|---|-----------------------------------|------------|---------------|---|------|---|-------|---------------------|
| | | | | LE | EARNING OUTCOME | | | 0 | 2 | | | 5 | 4 | Form | nat No. 4 |
| COUR | SE NAME | - | tion and Air (| Conditi | ioning | | | | | | I | | | | |
| CO De | scription | CO-5 Mai | intain a given | air coi | nditioning system. | | | | | | | | | | |
| LO De | scription | LO-54 Pra | ctice maintena | ince, se | rvicing and repairing proce | edures for a | given | air co | onditio | oning syste | em. | | | | |
| | | | | | SCHEME OF | F STUDY | | | | | | | | | |
| S. No. |] | Learning (| Content | | Teaching –Learning Method | Descri | iptior Proce | | '-L | Teach Hrs. | Pra /Tut l | | LR Requi | | Remark |
| Air-conditioning Installation Procedure, Faults in Air-conditioning System, Servicing of Air-conditioning, Brief idea about Cooling load estimation and factors affecting cooling load estimation. Applications of Air-conditioning i.e. Residential, offices, Hospitals, commercial buildings Malls etc. | | | | vstem, idea actors ation. i.e. | Interactive Classroom method, Handout PPTs, Charts and Videos. | Teacher w contents a handout to Teacher w Quiz/visit students p knowledg | nd pr o stud vill co to m oractic | ovide lents. onduct nake | | 1 | 6 | | Handouts, Charts, Videos, models | | |
| | | | | | SCHEME OF AS | SSESSME | NT | | | | | | | | |
| S. No. | Metho Assess | | | Descr | iption of Assessment | |] | Maxi Ma | mum rks | Res | ources | Req | uired | | ternal / nternal |
| 1 | Paper pen / Observation (Practical Co | | | | d to supervise maintenance air conditioning system/co | | | 1 | 0 | Obs | t paper, ervation ck list/ l e | Sche | | Exter | nal |
| | 1 | | ADDITIC | DNAL | INSTRUCTIONS FOR | R THE HO | D/ F | ACU | LTY | (IF ANY | ') | | | | |
| | | | | | (Part of End Semester | | | | | | | | | | |

| CO | LO | Hours | Marks | Comp | onent |
|-------|---------|-----------|-------|------------|--------|
| | | | | Th/ Pr | Int / |
| | | | | | Ext |
| CO 1 | LO- 11 | 7 + 0 | 10 | Th | Int |
| | | | | | (PT-1) |
| | LO- 12 | 7 + 0 | 10 | Th | Ext |
| CO 2 | LO - 21 | 1+6 | 10 | Pr | Int |
| | LO - 21 | 1 ± 0 | 10 | F 1 | IIIt |
| | LO - 22 | 7 + 0 | 10 | Th | Ext |
| | | | | | |
| | LO - 23 | 7 + 0 | 10 | Th | Int |
| | | | | | (TW) |
| | LO - 24 | 7 + 0 | 10 | Th | Ext |
| | | | | | |
| CO 3 | LO - 31 | 7 + 0 | 10 | Th | Ext |
| | | | | | |
| | LO - 32 | 7 + 0 | 10 | Th | Ext |
| | | | 10 | | - |
| CO 4 | LO - 41 | 3 + 4 | 10 | Pr | Int |
| | LO - 42 | 1+6 | 10 | Da | Ent |
| | LO - 42 | 1 + 0 | 10 | Pr | Ext |
| | LO - 43 | 1+6 | 10 | Pr | Ext |
| | LO 43 | 1 1 0 | 10 | 11 | LA |
| CO 5 | LO- 51 | 7 + 0 | 10 | Th | Int |
| | | | | | (PT-2) |
| | LO - 52 | 7 + 0 | 10 | Th | Ext |
| | | | | | |
| | LO - 53 | 5 + 2 | 10 | Th | Ext |
| | | | | | |
| | LO - 54 | 1+6 | 10 | Pr | Ext |
| TOTAL | | 75 + 31 | 150 | | |
| | | 13 + 31 | 130 | | |
| | | | | | |

Suggested List of Experiments:

- 1. Study on at least one Vapour compression refrigeration system available in Laboratory, market or virtual system. Then drawing P-h, T-s diagrams and schematic arrangement.
- 2. Study on Vapour compression refrigeration system using, Ammonia, Freon, etc using as refrigerants and compare their performance regarding global warming and ozone layer depletion.
- 3. Study on refrigeration system used in Ice manufacturing plant, Ice-cream manufacturing plant, Cold storage plant, Dairy (milk chilling) plant regarding refrigeration process and equipments used.
- 4. Cutting, Bending, Flaring and swaging operation on copper tube used in Refrigeration and Air- Conditioning systems.
- 5. Brazing operation in tube used in Refrigeration and Air- Conditioning systems.
- 6. Study/Perform Evacuation, charging and leakage testing of refrigerant in Refrigeration and Air- Conditioning systems.
- 7. Study of installation, fault tracing and servicing procedure of Refrigeration and Air- Conditioning systems.
- 8. Study on Cooling load estimation of Residential buildings, Commercial buildings, Offices, Hospitals, Malls. etc. and list the factors affecting it.

Suggested books for studies:

- 1. Refrigeration and Air-Conditioning by Ramesh Chandra Arora. PHI Learning Private Limited New Delhi- 110001.
- 2. Refrigeration and Air-Conditioning by S. N. Sapali, PHI Learning Private Limited New Delhi- 110001.
- 3. Refrigeration and Air-Conditioning by C P Arora. Tata Mcgraw-Hill Publishing Company Limited, New Delhi.
- 4. A course in Refrigeration and Air-Conditioning by Domkundwar Arora. Dhanpat Rai & Co.
- 5. Refrigeration and Air-Conditioning by R.S. Khurmi, J.K. Gupta. Eurasia Publishing House (P) Ltd, New Delhi- 110055.