GANDHI ACADEMY OF TECHNOLOGY AND ENGINEERING

LESSON PLAN

Session (2023-2024)

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| **Discipline:** Mechanical Engg. | **Semester:** 5th | **Name of the Faculty:**  Mr. Man Mohan Patnaik |
| **Subject:** Refrigeration and Air Conditioning | **No of Days/week:** 04 | Class Test: 20  End Semester Examination:80 |

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| **Week** | **Class Day** | **Theory Topics** |
| 1st | 1st | Concept of refrigeration and unit of refrigeration. |
| 2nd | Definition of COP, Refrigerating effect (R.E ) |
| 3rd | Principle of working of open and closed air system of refrigeration. |
| 4th | Calculation of COP of Bell-Coleman cycle and Problem Solving. |
| 2nd | 1st | Schematic diagram of simple vapors compression refrigeration system |
| 2nd | Cycle with dry saturated vapors after compression |
| 3rd | Cycle with wet vapors after compression. |
| 4th | Cycle with superheated vapors after compression. |
| 3rd | 1st | Cycle with superheated vapors before compression |
| 2nd | Cycle with sub cooling of refrigerant |
| 3rd | Representation of above cycle on temperature entropy and pressure enthalpy diagram. Problem solving (determination of COP,mass flow) |
| 4th | Practice Test/Assignment |

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| **Week** | **Class Day** | **Theory Topics** |
| 4th | 1st | Working principle of Simple vapor absorption refrigeration  system |
| 2nd | Working principle of Practical vapor absorption refrigeration  system |
| 3rd | COP of an ideal vapor absorption refrigeration system  Problem solving on COP |
| 4th | Refrigerant compressors, Working  Principle of working and constructional details of reciprocating and rotary compressors. |
| 5th | 1st | Centrifugal compressor, Hermetically and semi hermetically sealed compressor. |
| 2nd | Principle of working and constructional details of air cooled and water cooled condenser. |
| 3rd | Heat rejection ratio. Cooling tower and spray pond |
| 4th | Class Test/Assignment |
| 6th | 1st | Recap/Summerize |
| 2nd | Principle of working and constructional details of an evaporator. |
| 3rd | Types of evaporator.  Bare tube coil evaporator. |
| 4th | Finned evaporator, shell and tube evaporator. |
| 7th | 1st | Function of expansion valves Working of Capillary tube |
| 2nd | Working principle of Automatic expansion valve |
| 3rd | Working principle of Thermostatic expansion valve |
| 4th | Recap/Summerize |
| 8th | 1st | Classification of refrigerants |
| 2nd | Desirable properties of an ideal refrigerant. |
| 3rd | Designation of refrigerant. |
| 4th | Thermodynamic Properties of Refrigerants. |
| 9th | 1st | Chemical properties of refrigerants. |
| 2nd | Commonly used refrigerants, R-11, R-12, R-22, R-134a, R-717 |
| 3rd | Applications of refrigeration |
| 4th | Class Test/Assignment |

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| **Week** | **Class Day** | **Theory Topics** |
| 10th | 1st | Recap/Summerize |
| 2nd | Working details of cold storage |
| 3rd | Substitute for CFC |
| 4th | Ice plant and dairy refrigeration |
| 11th | 1st | Working principle of water cooler |
| 2nd | Recap/Summerize |
| 3rd | Discussion about frost free refrigerator. |
| 4th | Psychometric terms |
| 12th | 1st | Adiabatic saturation of air by evaporation of water. |
| 2nd | Class Test/Assignment |
| 3rd | Recap/Summerize |
| 4th | Psychometric chart and uses. |
| 13th | 1st | Psychometric processes |
| 2nd | Sensible heating and Cooling |
| 3rd | Cooling and Dehumidification |
| 4th | Heating and Humidification |
| 14th | 1st | Adiabatic cooling with humidification, Total heating of a cooling process  SHF, BPF, |
| 2nd | Adiabatic mixing, Problem solving. |
| 3rd | Effective temperature and Comfort chart. |
| 5th | Factors affecting comfort air conditioning. Equipment used in an air-conditioning. |
|  | 1st | Classification of air-conditioning system, Winter Air  Conditioning System |
| 2nd | Summer air-conditioning system. Numerical on above |

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| 15th | 3rd | Revision and Question discussion |
| 4th | Revision and Question discussion. |