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| Discipline :  **MECHANICAL ENGG** | Semester  : **5th** | Name of the Teaching Faculty: : **NITYANANDA PATRA** |
| Subject: **RAC** | No. of days/per week class allotted: **04** | No. of Weeks: **15** |
| Week | Class Day | Theory / Practical Topics |
| 1ST | 1ST | **AIR REFRIGERATION CYCLE.**  Definition 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 numerical on it |
| 2ND | 1ST | Calculation of COP of Bell-Coleman cycle and numerical on it |
|  | 2ND | **SIMPLE VAPOUR COMPRESSION REFRIGERATION SYSTEM**  schematic diagram of simple vapors compression refrigeration system |
|  | 3RD | Types  Cycle with dry saturated vapors after compression. |
|  | 4TH | Cycle with wet vapors after compression. |
| 3RD | 1ST | Cycle with superheated vapors after compression |
|  | 2ND | Cycle with superheated vapors before compression. |
|  | 3RD | Cycle with sub cooling of refrigerant |
|  | 4TH | Representation of above cycle on temperature entropy and pressure enthalpy diagram |
| 4TH | 1ST | Numerical on above (determination of COP,mass flow) |
|  | 2ND | Numerical on above (determination of COP,mass flow) |
|  | 3RD | Numerical on above (determination of COP,mass flow) |
|  | 4TH | **VAPOUR ABSORPTION REFRIGERATION SYSTEM**  Simple vapor absorption refrigeration system |
| 5TH | 1ST | Practical vapor absorption refrigeration system |
|  | 2ND | COP of an ideal vapor absorption refrigeration system |
|  | 3RD | Numerical on COP. |
|  | 4TH | Numerical on COP. |
| 6TH | 1ST | Numerical on COP. |
|  | 2ND | Numerical on COP. |
|  | 3RD | **REFRIGERATION EQUIPMENTS**  REFRIGERANT COMPRESSORS  Principle of working and constructional details of reciprocating and rotary compressors |
|  | 4TH | Centrifugal compressor only theory Important terms |
| 7TH | 1ST | Hermetically and semi hermetically sealed compressor. |
|  | 2ND | **CONDENSERS**  Principle of working and constructional details of air cooled and water cooled condenser |
|  | 3RD | Heat rejection ratio. |

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|  |  | Cooling tower and spray pond. |
|  | 4TH | **EVAPORATORS**  Principle of working and constructional details of an evaporator. |
| 8TH | 1ST | Types of evaporator. |
|  | 2ND | Bare tube coil evaporator, finned evaporator, shell and tube evaporator. |
|  | 3RD | **REFRIGERANT FLOW CONTROLS, REFRIGERANTS & APPLICATIONOF REFRIGERANTS**  EXPANSION VALVES  Capillary tube  Automatic expansion valve Thermostatic expansion valve |
|  | 4TH | REFRIGERANTS  Classification of refrigerants |
| 9TH | 1ST | Desirable properties of an ideal refrigerant. Designation of refrigerant. |
|  | 2ND | Thermodynamic Properties of Refrigerants. Chemical properties of refrigerants. |
|  | 3RD | commonly used refrigerants, R-11, R-12, R-22, R-134a, R-717 |
|  | 4TH | Substitute for CFC |
| 10TH | 1ST | Applications of refrigeration cold storage |
|  | 2ND | dairy refrigeration |
|  | 3RD | ice plant water cooler |
|  | 4TH | frost free refrigerator |
| 11TH | 1ST | **PSYCHOMETRICS &COMFORT AIR CONDITIONING SYSTEMS**  Psychometric terms |
|  | 2ND | Adiabatic saturation of air by evaporation of water Psychometric chart and uses. |
|  | 3RD | Psychometric processes  Sensible heating and Cooling |
|  | 4TH | Cooling and Dehumidification Heating and Humidification |
| 12TH | 1ST | Adiabatic cooling with humidification Total heating of a cooling process |
|  | 2ND | SHF, BPF, |

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|  |  | Adiabatic mixing |
|  | 3RD | Problems on above. |
|  | 4TH | Problems on above. |
| 13TH | 1ST | Problems on above. |
|  | 2ND | Effective temperature and Comfort chart |
|  | 3RD | **AIR CONDITIONING SYSTEMS**  Factors affecting comfort air conditioning. . |
|  | 4TH | Equipment used in an air-conditioning |
| 14TH | 1ST | Classification of air-conditioning system |
|  | 2ND | Winter Air Conditioning System |
|  | 3RD | Summer air-conditioning system. |
|  | 4TH | Numerical on above |
| 15TH | 1ST | Numerical on above |
|  | 2ND | Numerical on above |
|  | 3RD | Numerical on above |
|  | 4TH | Numerical on above |

Learning Resouces:

1. **REFRIGERATION AND AIRCONDITIONING BY C.P ARRORA, TMH**
2. **REFRIGERATION AND AIRCONDITIONING BY R.S.KHURMI&J.K.GOPTA, S.CHAND**
3. **REFRIGERATION AND AIRCONDITIONING BY P.L BALLANY, KHANNA PUBLISHER**
4. **REFRIGERATION AND AIRCONDITIONING BY DOMKUNDRA ANDARORA, DHANPAT RAYAND SONS**

**NITYANANDA PATRA**

Mech. Engg. Dept