- SEMETSER:- V
- COURSE NO.:- FE-358
- COURSE TITLE:- REFRIGERATION ENGINEERING AND COLD CHAIN
- CREDITS:- 3(2+1)

➢ THEORY

NO. OF UNITS	TOPICS	NO. OF LECTURES
1	*Definition of refrigeration and air conditioning, necessity of refrigeration and air conditioning. History of refrigeration*	*3*
2	*Refrigerants, definition, classification, nomenclature, methane and ethane series. Desirable properties of refrigerants- physical, chemical, safety, thermodynamic and economical. Azeotropes*	*4*
3	*Components of vapour compression refrigeration system, evaporator, compressor, condenser and expansion valve*	*4*
4	*Ice manufacture, principles of ice production, different systems Treatment of water for making ice, Brines, Freezing tanks, ice cans, air agitation, quality of ice*	*4*
5	*Applications of refrigeration in different food products – fruit and vegetable products, meat products, fish, poultry products, dairy products etc*	*4*
6	*Food Freezing:* *Freezing systems:* *Indirect contact systems, plate freezers, air blast freezers, and freezers for liquid foods. Direct contact systems, air blast immersion, frozen food properties, density, thermal conductivity enthalpy, apparent specific heat and thermal diffusivity, freezing time, factors influencing freezing time, freezing rate, thawing time*	*6*
7	*Frozen food storage,Quality changes in foods during frozen storage*	*5*
	TOTAL	**30**

➢ PRACTICALS

NO. OF UNITS	TOPICS	NO. OF EXPT.
1	*Standard refrigeration symbols*	*1*
2	*To study vapour compression refrigeration system*	*1*
3	*Solving problems on cooling load calculations / Refrigeration load*	*3*
4	*To study the properties and performance characteristics of some commonly used refrigerants*	*2*
5	*To study the components of the refrigeration system*	*3*
6	*Freezing of foods by different methods*	*3*
7	*Determination of freezing time of a food material*	*2*
	TOTAL	**15**

- *Reference Books:*

- *Refrigeration and air-conditioning* — *Manohar Prasad*
- *Introduction to Food Engineering* — *R. P. Singh and D. R. Heldman*
- *A course in Refrigeration and air conditioning* — *S. C. Arora and S. Domkundwar*