

Course No : PFE 355 **Course Title:** : Dairy and Food Engineering
Semester: **Credits:** : V3 (2+1)

Syllabus Theory

Food deterioration and spoilage. Physical, chemical and biological methods of food preservation. Nanotechnology. Composition and proximate analysis of food products.

Dairy development in India. Properties of milk and milk products. Unit operation of various dairy and food processing systems. Material and energy balances. Process flow charts for Butter, Ghee (butter oil), Yoghurt, Paneer, Milk powder, Ice-cream, and Cheese. Principles and equipment related to receiving of milk, pasteurization, sterilization, homogenization, centrifugation and cream separation. Dairy plant design and layout.

Principles of operation and equipment for food processing, Canning, Aseptic processing, Evaporation of food products: principle, types of evaporators, steam economy, multiple effect evaporation. Freezing.

Drying and dehydration of liquid and perishable foods: Phase diagram and triple point of water. Cabinet drying, Drum drying, Freeze drying, and Spray drying.

Filtration: principle, types of filters. Membrane separation, RO, Nano-filtration, Ultra filtration and Macro-filtration.

Non-thermal food processing techniques. Filling and packaging. Plant utilities and sanitation requirement.

Practical

Proximate analysis of food. Numerical on material and energy balance. Study of pasteurizers, Study of homogenizers. Study of cream separators. Study of butter churner. Study of evaporators and numerical. Numerical on freezing. Study freeze dryer. Study of spray dryers. Study of food processing plant design and layout, Utilities and estimation of steam requirement for dairy food processing plant. Visit to dairy and food industries.

