Department of Agricultural Process Engineering

Course No :	**ELE - PFE 481**	**Course Title :**	**Food Quality and Control**
Semester :	**: VIII**	**Credits :**	**: 3 (2+1)**

Syllabus
Theory

Concept, Objectives and need of food quality. Food quality management –TQM. Food adulteration and food safety. Food Safety management system –GAP ,GHP, GMP, Hazards and HACCP Sanitation in food industry (SSOP) .Food Laws and Regulations in India .FSSAI.CAC(Codex Alimentarius Commission). Food grades and standards BIS, AGMARK ,PFA , FPO ,ISO 9000 ,22000 Series Measurement of colour ,flavour ,consistency,viscosity ,texture and their relationship with food quality and composition .Methods of food Analysis. Subjective and objective tests. Sensory evaluation methods. Instrumental method.

Practical

Determination of moisture content of food product. Determination of protein content of food product. Determination of carbohydrates of food product. Determination of fats of food products. Study on microbial count of food products. Development of HACCP for milk processing .Visit to food testing laboratory .Visit to milk quality testing laboratory

Course No :	**ELE- PFE 482**	**Course Title :**	**Process Equipment Design**
Semester :	**: VIII**	**Credits :**	**: 3 (2+1)**

Syllabus

Theory

Introduction on process equipment design. Design parameters and general design procedure, Material specification, Types of material for process equipment, Design codes,Application of design engineering for food processing equipment.
Design ofprocess equipments -Pressure vessel, Tubular heat exchanger, Shell and tube heat exchanger and Plate heat exchanger.

Design of process :Air screen cleaner, Cyclone separator, LSU and spray dryer, Belt conveyer, Screw conveyer and Bucket elevator.

Design of milling equipment.

Optimization of design with respect to process efficiency, energy and cost.
Computer Aided Design for food processing machineries.

Practical

Numerical :Design of pressure vessel, cleaners, milling equipments, tubular heat exchanger, shell and tube type heat exchanger, plate heat exchanger, dryer, belt conveyor, bucket elevator, screw conveyor.

Course No :	**ELE PFE 483**	**Course Title :**	**Food Packaging**
Semester :	**: VIII**	**Credits :**	**: 3 (2+1)**

Course Content

Theory

Factors affecting shelf life of food material during storage, Interactions of spoilage agents with environmental factors as water, oxygen, light, pH, etc. and general principles of control of the spoilage agents; Difference between food infection, food intoxication and allergy. Packaging of foods, requirement, importance and scope, frame work of packaging strategy, environmental considerations, Packaging systems, types: flexible and rigid; retail and bulk; levels of packaging; special solutions and packaging machines, technical packaging systems and data management packaging systems, Different types of packaging materials, their key properties and applications, Metal cans, manufacture of two piece and three piece cans, Plastic packaging, different types of polymers used in food packaging and their barrier properties. manufacture of plastic packaging materials, profile extrusion, blown film/ sheet extrusion, blow molding, extrusion blow molding, injection blow molding, stretch blow molding, injection molding. Glass containers, types of glass used in food packaging, manufacture of glass and glass containers, closures for glass containers. Paper and paper board packaging, paper and paper board manufacture process, modification of barrier properties and characteristics of paper/ boards. Relative advantages and disadvantages of different packaging materials; Effect of these materials on packed commodities. Nutritional labelling on packages, CAS and MAP, Shrink and cling packaging, Vacuum and gas packaging; Active packaging, Smart packaging, Packaging requirement for raw and processed foods, and their selection of packaging materials, Factors affecting the choice of packaging materials, Disposal and recycle of packaging waste, Printing and labelling, Lamination, Package testing: Testing methods for flexible materials, rigid materials and semi rigid materials; Tests for paper (thickness, bursting strength, breaking length, stiffness, tear resistance, folding endurance, ply bond test, surface oil absorption test, etc.), plastic film and laminates (thickness, tensile strength, gloss, haze, burning test to identify polymer, etc.), aluminium foil (thickness, pin holes, etc.), glass containers (visual defects, colour, dimensions, impact strength, etc.), metal containers (pressure test, product compatibility, etc.)

Practical

Identification of different types of packaging materials, Determination of tensile/ compressive strength of given material/package, To perform different destructive and non-destructive tests for glass containers, Vacuum packaging of agricultural produces, Determination of tearing strength of paper board, Measurement of thickness of packaging materials, To perform grease-resistance test in plastic pouches, Determination of bursting strength of packaging material, Determination of water-vapour transmission rate, Shrink wrapping of various horticultural produce, Testing of chemical resistance of packaging materials, Determination of drop test of food package, Experiment on bottling of fruit

products, Aseptic packaging, Modified atmospheric packaging and Visit to packaging industries.