Food Engineering - Web course

COURSE OUTLINE

The food industry is the largest industrial sector of the economy. Food engineers conceive, design, and operate food processes, equipment, and plants for efficient food production with minimal impact on the environment.

Students specializing in food engineering learn to apply engineering principles and concepts to handling, storing, processing, packaging, and distributing food and related products.

In addition to engineering principles, the food engineering specialization is intended to provide an understanding of the chemical, biochemical, microbiological, and physical characteristics of foods.

In the junior and senior years, students take courses that focus on the integration of biological and food science with engineering.

Concepts of food refrigeration, freezing, thermal processing, drying, and other food operations are studied.

COURSE DETAIL

S.No	Topics	No. of Hours
1	Introduction, general aspects of food industry, world food demand and Indian scenario, constituents of food, quality and nutritive aspects. Food additives, standards, deteriorative factors and their control, preliminary processing methods, conversion and preservation operation.	5
2	Energy Engineering in Food Processing -	8

NP-TEL

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Chemical Engineering

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	Generation of Steam, Fuel Utilization, Electric Power Utilization , Process Controls i n Food Processing, Systems for Heating and Cooling Food Products. Thermal Properties of Foods , Modes of Heat Transfer - Freezing Systems , Frozen-Food Properties , Freezing Time refrigeration system for food products.	
3	Processing Systems, Microbial Survivor Curves , Influence of External Agents , Thermal Death Time , Spoilage Probability. General Method for Process Calculation Preservation by heat and cold dehydration, concentration, frying, irradiation, microwave heating, sterilization and pasteurization, fermentation and pickling, packing methods.	10
4	Separation processes in food processing-Electrodialysis Systems , Reverse Osmosis Membrane Systems , Membrane Performance , Ultrafiltration Membrane Systems,Concentration Polarization. Types of Reverse-Osmosis and Ultrafiltration Systems, Drying Processes , Dehydration Systems , Dehydration System Design,Sedimentation , Centrifugation , Mixing.	6
5	Production and utilization of food products - soft and alcoholic beverages, diary products, meat, poultry and fish products, treatment and disposal of food processing wastes.	5
6	Packaging - Introduction , Food Protection , P r o d u c t Containment , Product Communication , Product Convenience , Mass Transfer in Packaging Materials. Innovations in Food Packaging , Food Packaging and Product Shelf-life, Food canning technology, fundamentals of food canning technology. Heat sterilization of canned food, containers - metal, glass and flexible packaging.	6

	Canning procedures for fruits, vegetables, meats, poultry marine products.	
	Total	40

References:

1. Fundamentals of Food Engineering by Stanley Charm.
2. Introduction to Food Engineering - R. Paul Singh, Dennis R.
3. Heid, J.L. and Joslyn, M.A., Fundamentals of Food Processing Operation, The AVI Publishing Co; Westport, 1967.
4. Heldman, D.R., Food Process Engineering, The AVI Publishing Co; Westport, 1975.
5. Hall, C.W; Farall, A.W. & Rippen, A.L; Encyclopedia of Food Engineering, Van Nostrand - Reinhold.