

# Food Technology (GATE-XL -U)

## Unit 1: Food Chemistry and Nutrition

**Carbohydrates:** structure and functional properties of mono-, oligo-, & poly- saccharides including starch, cellulose, pectic substances and dietary fiber, gelatinization and retrogradation of starch.

**Proteins:** classification and structure of proteins in food, biochemical changes in post mortem and tenderization of muscles.

**Lipids:** classification and structure of lipids, rancidity, polymerization and polymorphism. Pigments: carotenoids, chlorophylls, anthocyanins, tannins and myoglobin.

**Food flavors:** terpenes, esters, aldehydes, ketones and quinines.

**Enzymes:** specificity, simple and inhibition kinetics, coenzymes, enzymatic and non- enzymatic browning.

**Nutrition:** balanced diet, essential amino acids and essential fatty acids, protein efficiency ratio, water soluble and fat-soluble vitamins, role of minerals in nutrition, co-factors, anti-nutrients, nutraceuticals, nutrient deficiency diseases.

**Chemical and biochemical changes:** changes occur in foods during different processing.

## Unit 2: Food Microbiology

**Characteristics of microorganisms:** morphology of bacteria, yeast, mold and actinomycetes, spores and vegetative cells, gram-staining.

**Microbial growth:** growth and death kinetics, serial dilution technique.

**Food spoilage:** spoilage microorganisms in different food products including milk, fish, meat, egg, cereals and their products.

**Toxins from microbes:** pathogens and non-pathogens including *Staphylococcus*, *Salmonella*, *Shibboleth*, *Escherichia*, *Bacillus*, *Clostridium*, and *Aspergillums* genera.

**Fermented foods and beverages:** curd, yoghurt, cheese, pickles, soya-sauce, sauerkraut, idly, dosa, vinegar, alcoholic beverages and sausage.

## Unit 3: Food Products Technology

**Processing principles:** Thermal processing, chilling, freezing, dehydration, addition of preservatives and food additives, irradiation, fermentation, hurdle technology, intermediate moisture foods.

**Food packaging and storage:** packaging materials, aseptic packaging, controlled and modified atmosphere storage.

**Cereal processing and products:** milling of rice, wheat, and maize, parboiling of paddy, bread, biscuits, extruded products and ready to eat breakfast cereals.

**Oil processing:** expelling, solvent extraction, refining and hydrogenation.

**Fruits and vegetables processing:** extraction, clarification, concentration and packaging of fruit juice, jam, jelly, marmalade, squash, candies, tomato sauce, ketchup, and puree, potato chips, pickles.

**Plantation crops processing and products:** tea, coffee, cocoa, spice, extraction of essential oils and oleoresins from spices.

**Milk and milk products processing:** pasteurization and sterilization, cream, butter, ghee, ice-cream, cheese and milk powder.

**Processing of animal products:** drying, canning, and freezing of fish and meat; production of egg powder.

**Waste utilization:** pectin from fruit wastes, uses of by-products from rice milling.

**Food standards and quality maintenance:** FPO, PFA, A-Mark, ISI, HACCP, food plant sanitation and cleaning in place (CIP).

## Unit 4: Food Engineering

**Mass and energy balance; Momentum transfer:** Flow rate and pressure drop relationships for Newtonian fluids flowing through pipe, Reynolds number.

**Heat transfer:** heat transfer by conduction, convection, radiation, heat exchangers.

**Mass transfer:** molecular diffusion and Fick's law, conduction and convective mass transfer, permeability through single and multilayer films.

**Mechanical operations:** size reduction of solids, high pressure homogenization, filtration, centrifugation, settling, sieving, mixing & agitation of liquid.

**Thermal operations:** thermal sterilization, evaporation of liquid foods, hot air drying of solids, spray and freeze-drying, freezing and crystallization.

**Mass transfer operations:** psychrometric, humidification and dehumidification operations.

## Food Technology Institutes



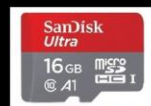
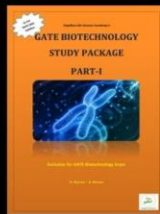
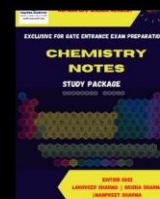
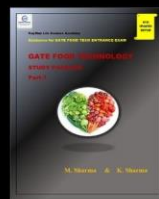
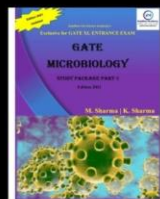
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