

Syllabus for M.Tech Food Technology Entrance

Chemical Engineering Thermodynamics: Laws of thermodynamics, thermodynamic properties, general thermodynamic relationships. Application for open/closed systems and reversible/irreversible processes, Raoult's Law. Chemical reaction equilibrium.

Chemical Reaction Engineering: Molecularity and order of reaction, reaction kinetics, different types of ideal reactors and their performance equations.

Heat Transfer: Different modes of heat transfer with governing relationships, Fourier's law, Steady state heat transfer through plain and composite slab, Cylindrical and spherical surfaces, Natural and forced convection, Radiation heat transfer. Heat transfer equipments and their industrial applications.

Mass Transfer: Fick's law of diffusion, Mass transfer operations and their applications, Molecular diffusion, eddy diffusion, diffusion in solids. Simple (differential) distillation, Rectification (Fractionating column) distillation, crystallization, drying - Moisture content on dry and wet basis, Equilibrium moisture content, Constant and falling rate phase calculations, Critical moisture content, absorption, equipment for separation and industrial application.

Unit operations: Calculation of energy required in grinding by Rittinger's law and Bond's law, Mixing index, Rate of mixing, agitation, Constant rate filtration, constant pressure filtration, Filter cake compressibility, Centrifuge equipment like cream separator and clarifiers used in dairy industry, crystallization.

Fluid flow: Physical properties of fluid, Classification of fluid flow, Continuity equation, Bernoulli's theorem, Concept of Reynold's number and its determination, Flow through parallel plates and circular pipes, Different type of pumps like centrifugal, reciprocating, rotary and piston displacement pumps, Concept of viscosity, Newtonian and non-Newtonian fluids.

Material and Energy balance: Material and energy balance calculation in processes with recycle/bypass/purge.

Process Instrumentations: Instruments for temperature, pressure, liquid level, flow and pH measurement.

Food Chemistry and Microbiology : Classification, physical and chemical properties of carbohydrates, proteins, lipids; types of pigments, vitamins and minerals; morphology, methods of reproduction and types of bacteria and fungi; microbiology of various food products.

Food Process Technology: Milling of cereals and pulses; oil extraction methods; standardization, homogenization and pasteurization of liquid milk; meat and poultry processing; production of alcoholic and non-alcoholic beverages; technology of manufacturing of fruits and vegetable products; different preservation techniques in foods.

Food Analysis and Quality Control : Quality attributes; food adulteration and its detection; physico-chemical and mechanical properties of foods; sensory evaluation; HACCP; Food Safety and Standards Act.

Ashraf