

SYLLABUS FOOD SCIENCE

Details	Marks
Unit 1: Fundamentals of Food Chemistry <ul style="list-style-type: none"> • Food attributes: colour, texture, flavour, nutritive value • Food spoilage: causes, microbial contamination, foodborne illnesses. • Water activity and its relation to spoilage. • Spoilage of processed foods; detection methods. • Carbohydrates; non-enzymatic browning (Maillard reaction, caramelisation). • Proteins & amino acids: structure, properties, denaturation. • Lipids: fatty acid composition, oxidation, rancidity. • Polyphenols & pigments: catechins, flavonols, anthocyanins, chlorophylls, carotenoids. • Alkaloids: caffeine, theobromine, theophylline. • Organic acids and flavour balance. • Enzymes in food processing. 	75
Unit 2: Food Preservation Principles & Methods <ul style="list-style-type: none"> • Heat processing, dehydration, freezing, canning, pasteurization. • Refrigerated and modified atmosphere storage. • Fermentation, microwave processing, irradiation, chemical preservatives. • Aseptic preservation, hurdle technology, hydrostatic pressure. • Non-thermal technologies: microfiltration, PEF, UHV, HPP, thermosonication. • Alternate heating: ohmic, dielectric, infrared, induction. • Biological preservation: bacteriocins, antibacterial enzymes. • Supercritical fluid extraction, cold plasma. 	
Unit 3: Foods of Plant Origin <ul style="list-style-type: none"> • Post-harvest handling & storage. • Thermal processing, canning, aseptic canning. • Dehydration; solar drying; intermediate moisture foods. • Juices & beverages: fermented, aerated, health drinks; membrane technology. • Convenience foods. • Processing of tea, coffee & cocoa. • Oleoresins, essential oils; medicinal & aromatic plants. 	
Unit 4: Milk & Dairy Technology <ul style="list-style-type: none"> • Dairy plant equipment & operations. • Handling, pasteurization, homogenization. • Types of milk: fortified, flavoured, reconstituted, humanized. • Fermented milks; dairy products—cream, butter, cheese, condensed/evaporated milk, milk powders, ice cream, cheese spreads, EMC. • Enzymes in dairy processing; sanitation; waste disposal. 	
Unit 5: Food Microbiology & Biotechnology <ul style="list-style-type: none"> • Fermentation technology & products. • Microbial spoilage; bacterial growth curve. • Hurdle technology. • Fermenters & bioreactors: aeration, agitation, sterilization. • Continuous & solid-state fermentation. • Biotechnology for improved nutrition & quality. • Microbial production of additives: preservatives, colourants, flavours. • Enzymes in food industry. • SCP; biomass from waste. • Food contaminants: aflatoxins, botulism, intoxications & infections. • Consumer concerns: safety, risks, values. 	
Unit 6: Flavour Chemistry & Technology <ul style="list-style-type: none"> • Flavour composition: identification & quantification. • Flavour development: maturation, microbial activity, processing. • Odour-active compound analysis (Charm analysis). • Microbial & plant-based flavour synthesis. • Lipid-derived flavours; antioxidant contributions. • Flavour emulsions, composites, essential oils & oleoresins. • Flavour encapsulation & stabilization. 	

Unit 7: Food Quality Management <ul style="list-style-type: none"> Objectives & functions of quality control. Quality systems: control charts, acceptance sampling, auditing, CCPs, recall. Food plant sanitation & hygiene. Waste management & environmental safety. TQM, GMP, HACCP, Codex. National & international laws: FSSAI, US-FDA, ISO-9000. Food adulteration & food safety. Sensory evaluation: panel methods, sensory & instrumental analysis. 	
Unit 8: Food Engineering / Packaging & Labelling <ul style="list-style-type: none"> Unit operations: grading, sorting, peeling, size reduction, energy balance. Automation: mixing, thermal processing, dehydration, CIP, QC. Packaging materials: properties, testing, shelf-life studies. Packaging methods: aseptic, MAP, vacuum, gas packaging. Nutritional labelling & container design. Recent trends in packaging. Time–Temperature Indicators (TTI), intelligent labels. 	
Unit 9: Consumer Sciences & Food Product Development <ul style="list-style-type: none"> Socio-cultural, psychological & economic aspects of consumers. Consumer trends & impact on product development. Product development stages. Food & nutrition; nutritional disorders. Functional properties: gelatinization, crystallization, gelation, foaming, emulsification. Therapeutic, engineered, organic, nutraceutical & functional foods. Nutrigenomics & personalized nutrition. Nanotechnology in functional foods. 	
Unit 10: Tea Science & Technology Tea Biochemistry <ul style="list-style-type: none"> Amino acids (theanine, glutamic acid), carbohydrates, lipids. Polyphenols (catechins → theaflavins & thearubigins), pigments, alkaloids. Organic acids; enzymes (PPO, peroxidase, lipoxygenase). Processing Operations <ul style="list-style-type: none"> Withering, Rolling/CTC, Fermentation, Drying. Sorting & grading. Tea Blending <ul style="list-style-type: none"> Blending with food ingredients and plant-based products. Tea Storage & Packaging <ul style="list-style-type: none"> Moisture control, flavour retention. Vacuum, nitrogen flushing, barrier films. Sensory Evaluation <ul style="list-style-type: none"> Colour, flavour, briskness, aroma, astringency. Chemical markers related to tea quality. 	
Unit 11: Analytical Facilities <ul style="list-style-type: none"> UV–Visible Spectroscopy High Performance Liquid Chromatography (HPLC) Gas Chromatography–Mass Spectrometry (GC-MS) Infrared Spectroscopy (IR) Near-Infrared Spectroscopy (NIR) Nuclear Magnetic Resonance (NMR) Fluorescence Spectroscopy Optical sorting systems Sensory panels and sensory instrumentation 	
Unit 12: General Studies <ul style="list-style-type: none"> General Reasoning General English General Awareness Innovative Knowledge 	25
Total Marks	100