SDG 2: ZERO HUNGER

Incorporating SDG 2 (Zero Hunger) helps students understand food security, sustainable agriculture, and nutrition challenges. The curriculum strengthens awareness of rural development and modern agricultural practices. Learners analyze food systems and policy frameworks. This supports sustainable solutions to hunger and malnutrition.



List of Courses mapped to SDG 2:

S.No	Course Title	Name of the Program	Justification for SDG Mapping
1	PRINCIPLES OF FOOD PRESERVATION	B.Sc. (Food Technology)	Teaches preservation methods that reduce post-harvest and food losses and extend food availability, strengthening food security.
2	HUMAN PHYSIOLOGY AND NUTRITION	B.Sc. (Food Technology)	Builds understanding of nutrient requirements and deficiency disorders, which underpins strategies to address malnutrition.
3	DIETARY SUPPLEMENTS AND NUTRACEUTICALS	B.Pharmacy	Covers nutrient supplementation and fortified products used to tackle micronutrient deficiencies and improve nutrition.
4	FOOD ADDITIVES AND ADULTERANTS	B.Sc. (Food Technology)	Addresses food safety and quality, supporting a safe and nutritious food supply for consumers.
5	INSIGHTS TO SUSTAINABLE DEVELOPMENT GOALS	All B.Tech Programs	Module 3 covers Zero Hunger, and Module 6 examines technology such as precision agriculture, helping students link food security with innovation.

Course Outcomes and Syllabus

Principles of Food Preservation

SDG 2

Course code: 22FT12C1 | L-T-P-S: 3-0-0-4 | Credits: 4 | Programme: B.Sc. (Food Technology)

CO	Course Outcome	PO / PSO	BTL
CO1	Introduction to food preservation techniques.	PO 1, 3, 5. PSO 3	2
CO2	To get acquainted to conventional food preservation techniques	PO 1, 3, 5. PSO 3	3
CO3	To understand modern filtration technology	PO 1, 3, 5. PSO 3	3
CO4	To know novel, i.e., non-thermal food processing techniques	PO 1, 3, 5. PSO 3	3
CO6	To able to know about the skilling techniques to be done in preservation of foods.	PO 1, 3, 5. PSO 3	4

Syllabus

Module 1: History, Scope and principles of food preservation; Preservation Methods- preservation by low temperature - processing, mechanism, refrigeration, chilling. Preservation Methods- preservation by low temperature - processing, mechanism, freezing, freezing curve, changes occurring during freezing, types of freezing, thawing, and its effects.

Module 2: Preservation by high temperature - Different thermal operations (sterilization, pasteurization, blanching, and UHT processing; Canning - canning equipment and operations). Types of canning containers. Thermal destruction of microorganisms – D- value, F- value, Z-value. Advantages and limitations. Chemical food preservation - Types of chemical preservatives and their functions (synthetic, natural); permissible limits and safety aspects. Advantages and limitations.

Module 3: Introduction to membrane processing - General principles, dead end and cross flow, Classification of membrane system - Reverse Osmosis. Classification of membrane system - Nano Filtration, Ultra Filtration, Micro Filtration, Electro-dialysis and Pervaporation. Commercial examples. Advantages and limitations.

Module 4: Introduction; Irradiation, microwave, radio-frequency, high-pressure processing, pulsed electric field, hurdle technology. Ohmic heating, cold plasma; modified- atmosphere packaging, vacuum packaging, aseptic processing, ultrasound. Advantages and limitations.

Human Physiology and Nutrition

SDG 2

Course code: 22FT11C2 | L-T-P-S: 3-0-0-0 | Credits: 3 | Programme: B.Sc. (Food Technology)

CO	Course Outcome	PO / PSO	BTL
CO1	Acquiring knowledge about macro and micro nutrients and their functions.	PO1, PO6, PSO1	2
CO2	To know the consequences of deficiency of nutrients.	PO1, PO6, PO11	3
CO3	To apply the concepts of nutrition and food and its relation to health.	PO1, PO4, PO6	3
CO4	To gain the knowledge of nutrition for disease prevention in the real time.	PO12, PO1, PO11	4

Syllabus

Module 1: Introduction To Food and Nutrition - Introduction and scope of Nutrition, ICMR Basic Five Food Groups, Relationship between Food, Nutrition, Health and Disease. Functions of food-physiological, psychological and social, Concept of Balanced Diet, Food Groups, Food Pyramid, BMI.

Module 2: Nutrients - Classification, digestion, functions, dietary sources, RDA, clinical manifestations of deficiency and excess and factors affecting absorption of the following in brief: Energy, Carbohydrates, lipids and proteins, Fat soluble vitamins-A, D, E and K, Water soluble vitamins – thiamin, riboflavin, niacin, pyridoxine, folate, vitamin B12 and vitamin C and Minerals – calcium, iron, iodine, fluorine, copper and zinc

Module 3: Energy - Energy value of foods – Determination of gross energy value of foods using Bomb calorimeter and Oxy calorimeter. Physiological energy value of foods. Factors affecting Basal Metabolic Rate, Measurement of BMR by Direct and Indirect Calorimetry. Formulas for calculating BMR. RDA and sources of energy.

Module 4: Concepts of Meal Planning and Methods of Cooking - Factors affecting meal planning, understanding specific considerations for planning meal for different groups of people. Dry, moist, frying and microwave cooking, Advantages, disadvantages and the effect of various methods of cooking on foods. Physiology of Gastrointestinal system – Description, organs, hormones, enzymes involved, Utilization and Absorption of Carbohydrates, proteins, fats. Physiology of renal system, organs of urinary system, structure of nephron.

Dietary Supplements and Nutraceuticals

SDG 2

Course code: 22PY4249ET | L-T-P-S: 3-1-0-0 | Credits: 4 | Programme: B.Pharmacy

CO	Course Outcome	PO / PSO	BTL
CO1	Understand the need of supplements by the different group of people to maintain healthy life.	PO2	2
CO2	Understand the Outcomes of deficiencies in dietary supplements.	PO2	2
CO3	Appreciate the components in dietary supplements and the application.	PO2	2
CO4	Appreciate the regulatory and commercial aspects of dietary supplements including health claims.	PO2	2

Syllabus

Definitions of Functional foods, Nutraceuticals and Dietary supplements. Classification of Nutraceuticals, Health problems and diseases that can be prevented or cured by Nutraceuticals i.e. weight control, diabetes, cancer, heart disease, stress, osteoarthritis, hypertension etc. Public health nutrition, maternal and child nutrition, nutrition and ageing, nutrition education in community. Source, Name of marker compounds and their chemical nature, Medicinal uses and health benefits of following used as nutraceuticals/functional foods: Spirulina, Soyabean, Ginseng, Garlic, Broccoli, Gingko, Flaxseeds. Phytochemicals as nutraceuticals: Occurrence and characteristic features(chemical nature medicinal benefits) of following: Carotenoids- α and β-Carotene, Lycopene, Xanthophylls, leutin; Sulfides: Diallyl sulfides, Allyl trisulfide; Polyphenolics: Reservetrol; Flavonoids- Rutin , Naringin, Quercitin, Anthocyanidins, catechins, Flavones; Prebiotics / Probiotics.: Fructo oligosaccharides, Lactobacillum; Phyto estrogens : Isoflavones, daidzein, Geebustin, lignans; Tocopherols; Proteins, vitamins, minerals, cereal, vegetables and beverages as functional foods: oats, wheat bran, rice bran, sea foods, coffee, tea and the like. Introduction to free radicals: Free radicals, reactive oxygen species, production of free radicals in cells, damaging reactions of free radicals on lipids, proteins, Carbohydrates, nucleic acids. Dietary fibres and complex carbohydrates as functional food ingredients.. Free radicals in Diabetes mellitus, Inflammation, Ischemic reperfusion injury, Cancer, Atherosclerosis, Free radicals in brain metabolism and pathology, kidney damage, muscle damage. Free radicals involvement in other disorders. Free radicals theory of ageing. Antioxidants: Endogenous antioxidants enzymatic and nonenzymatic antioxidant defence, Superoxide dismutase, catalase, Glutathione peroxidase, Glutathione Vitamin C, Vitamin E, α- Lipoic acid, melatonin. Synthetic antioxidants: Butylated hydroxy Toluene, Butylated hydroxy Anisole. Functional foods for chronic disease prevention. Effect of processing, storage and interactions of various environmental factors on the potential of nutraceuticals. Regulatory Aspects; FSSAI, FDA, FPO, MPO, AGMARK. HACCP and GMPs on Food Safety. Adulteration of foods. Pharmacopoeial Specifications for dietary supplements and nutraceuticals.

Food Additives and Adulterants

SDG 2

Course code: 25SDFT02 | L-T-P-S: 1-0-0-4 | Credits: 2 | Programme: B.Sc. (Food Technology)

CO	Course Outcome	PO / PSO	BTL
CO1	To Understand the types and importance of food additives and adulterants	PO1, PO2, PO3	2
CO2	To Identify the mode of action, rolls and risks of food additives in food processing and storage	PO1, PO2, PO3	3
CO3	To Identify the impact of food additives and adulterants on nutrition and human health	PO1, PO2, PO3	3
CO4	To Analyse Food safety and regulatory frameworks governing food additives.	PO1, PO2, PO3	4
CO5	To Analyze the project on different food additives and adulterants.	PO1, PO2, PO3	4

Syllabus

Introduction to food additives: Definition, classification, functions, benefits, and potential risks. Consumer perception and attitude towards the use of food additives. Food additive intake assessment: scope and objectives.

Regulation of maximum permissible levels, and methods for estimating dietary intake of additives. Nutritional additives: vitamins, amino acids, fatty acids, minerals, trace elements, and dietary supplements.

Preservatives: classification of Class I and Class II preservatives as per FSSAI Act. Concept and significance of Generally Recognized as Safe (GRAS) substances.

Food additives for special dietary purposes: role in nutrition, palatability, processing requirements, stabilizers, thickeners, and emerging trends. Flavoring agents and flavor enhancers.

Sweeteners: classification into nutritive and non-nutritive sweeteners and criteria for selection based on product requirements.

Antioxidants: chemistry of lipid oxidation, mechanisms of oxidation inhibition, natural and synthetic antioxidants, relationship between antioxidants and health, and toxicological aspects.

Antimicrobial agents: introduction, classification, and applications in food preservation. Food colorants: natural and synthetic colorants — chemistry, sources, analytical methods, effects on food quality, and applications.

Enzymes: production methods and industrial applications in food processing. pH control agents and acidulants: introduction, antimicrobial mode of action, classification, chemical analysis, and assay methods.

Clarifying agents, gases and propellants, and other permitted additives. Commercial starches: applications and functional potential in food systems. Toxicological evaluation of additives, including interpretation of LD50 dose values.

Food adulteration: definition and classification, including poisonous substances, foreign matter, inferior substitutes, spoiled components, and adulteration through additives. Intentional and incidental adulteration and their impact on human health.

Means of adulteration and detection methods in milk, edible oils, ghee, cereals, pulses, sugar, spices, condiments, processed foods, fruits, vegetables, additives, and sweetening agents (minimum three methods for each food category in food quality and adulteration).

Laws and procedures related to food adulteration, with special reference to COPRA 2019, including offences, penalties, complaint procedures, and consumer compensation mechanisms.

Insights to Sustainable Development Goals

SDG 2

Course code: 25UC0032E | L-T-P-S: 2-0-0-0 | Credits: 0 | Programme: All B.Tech Programs

CO	Course Outcome	PO / PSO	BTL
CO1	Understand sustainable development — concept, pillars, and the road to the SDGs.	PO6, PO7, PSO1	2
CO2	Understand the 17 SDGs, their targets, and their interlinkages.	PO6, PO7, PSO1	2
CO3	Analyze the people-and-prosperity SDGs in the Indian and global context.	PO6, PO7, PSO2	4
CO4	Analyze the planet SDGs — climate, energy, water, and ecosystems.	PO6, PO7, PSO2	4
CO5	Apply SDG measurement, governance, and localisation.	PO7, PO11, PSO2	3
CO6	Analyze how technology, AI, and innovation can accelerate the SDGs.	PO5, PO7, PSO2	4

Syllabus

Module 1: Foundations of Sustainable Development. Topics: What sustainable development means; The Brundtland definition; The three pillars - economic, social, environmental; Planetary boundaries; From MDGs to SDGs; The 2030 Agenda and 'leave no one behind'; Sustainability vs growth debates; India's sustainability context. Labs: Map a real project against the three pillars of sustainability; Footprint lab: estimate and reduce a sustainability footprint. Case Study: a development-vs-environment trade-off (e.g., a dam/infrastructure project): analyse how the three pillars of sustainability were balanced or violated.

Module 2: The 17 SDGs Overview. Topics: Overview of all 17 goals; Targets and indicators; The SDG 'wedding cake' model; Interlinkages and trade-offs among goals; Synergies across goals; 'Leave no one behind'; The global indicator framework; Tracking progress. Labs: Build an SDG interlinkage map for a chosen development problem; Indicator lab: interpret SDG progress data for a country/state. Case Study: SDG interlinkages in practice (e.g., clean energy enabling health and education): analyse how progress on one goal advances others.

Module 3: People & Prosperity SDGs. Topics: No poverty and zero hunger; Good health and well-being; Quality education; Gender equality; Decent work and economic growth; Reduced inequalities; Industry, innovation, and infrastructure; India's progress on people/prosperity goals. Labs: Analyse a region's people/prosperity indicators and gaps; Design an intervention targeting a people/prosperity SDG. Case Study: an Indian social initiative (e.g., a health/education/livelihood program): analyse its SDG contribution and outcomes.

Module 4: Planet SDGs. Topics: Clean water and sanitation; Affordable and clean energy; Climate action; Life below water; Life on land; Sustainable cities and communities; Responsible consumption and production; Circular economy. Labs: Audit a setting for responsible consumption and propose circular fixes; Design a planet-SDG (energy/water/waste) solution for a community. Case Study: a clean-energy or water initiative in India (e.g., solar mission / river rejuvenation): analyse its planet-SDG impact and scalability.

Module 5: Partnership, Governance & Measurement. Topics: Peace, justice, and strong institutions (SDG16); Partnerships for the goals (SDG17); Financing the SDGs; Indicators and the SDG India Index; Localising the SDGs; Voluntary National Reviews; Role of governments, business, and civil society; Accountability and reporting. Labs: Build an SDG scorecard for an organisation/community; Design a multi-stakeholder partnership for an SDG target. Case Study: the SDG India Index / a state's SDG localisation: analyse how SDGs are measured and localised, and what drives improvement.

Module 6: Technology, AI & Innovation for the SDGs. Topics: Technology as an SDG accelerator; AI for good - use cases across goals; Social entrepreneurship and impact ventures; Frugal and inclusive innovation; Digital public infrastructure for development; Measuring impact (theory of change); The engineer's and youth's role; Designing an SDG-aligned solution. Labs: Design a technology/AI-enabled solution mapped to an SDG with a theory of change; Pitch a social-impact venture targeting one or more SDGs. Case Study: AI/technology for an SDG (e.g., AI in healthcare access or precision agriculture): analyse how technology accelerates a specific goal, with its risks.