**DEPARTMENT OF FOOD TECHNOLOGY**

**Name of the Faculty: Ms. Swarnima Dey**

**Subject: Introduction to Food Science Class: B.Sc.(H) FT Year & Semester: Ist & Ist**

**TEACHING, LEARNING & EVALUATION PLAN**

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| S.No. | Topic & Coverage | Lecture sessions schedule | Lecture sessions held | Pedagogy | Activity | Unit Objective | Unit Learning outcome | Remark |
| Unit 01 | **Introduction to Food Science** | | | * Integrative * Inquiry based | * Test * Presentation * Lecture Notes | To comprehend the core principles of Food Science, distinguishing between Food Science and Food Technology, exploring the interdisciplinary nature of the field, elucidating the roles of Food Scientists, and analyzing the impact of physical, thermal, and rheological properties on food quality and processing. | Upon completion, students will demonstrate a comprehensive understanding of Food Science fundamentals, including the distinction between Food Science and Food Technology, comprehension of interdisciplinary aspects, recognition of Food Scientists' roles, and the influence of physical, thermal, and rheological properties on food. |  |
| Definition of Food Science. | 1 | 1 |
| Difference between food science and food technology. | 1 | 1 |
| Roles and Responsibilities of Food Scientists. | 1 | 1 |
| Interdisciplinary Nature of Food Science. | 1 | 1 |
| Physical, thermal and rheological property of food. | 2 | 2 |
| Unit 02 | Fats and Oils | | | * Constructive * Integrative * Inquiry based | * Quiz * Test * Laboratory * Presentation * Lecture Notes | Comprehend the classification of lipids, types of fatty acids, oil refining methods with their respective advantages and limitations, hydrogenation processes, and identify the types of rancidity while exploring preventive measures against hydrolytic and oxidative rancidity. | By the end of this unit, students will demonstrate a comprehensive understanding of lipid classification, fatty acid types, oil refining methods, including their advantages and limitations, hydrogenation processes, various forms of rancidity, and effective preventive measures against hydrolytic and oxidative rancidity. |  |
| Classification of lipids. | 1 | 1 |
| Types of fatty acids - saturated fatty acids, unsaturated fatty acids, essential fatty acids, trans-fatty acids. | 2 | 3 |
| Refining of oils, methods of refining-  their advantages and limitations. | 6 | 7 |
| Hydrogenation. | 3 | 2 |
| Rancidity | 5 | 6 |
| Types- hydrolytic and oxidative rancidity and | 2 | 3 |
| Its prevention. | 1 | 1 |
| Unit 03 | Cereals, Millets & Pulses | | | * Constructivist * Integrative * Inquiry based | * Quiz * Test * Laboratory * Presentation * Lecture Notes | To understand the structural composition, nutritional value, processing techniques (such as malting and gelatinization), browning reactions (Maillard & caramelization), and identification of toxic (anti-nutritional) constituents within cereals, millets, and pulses for comprehensive analysis and utilization. | Students will be able to develop an in-depth understanding of the structural components, nutritional profiles, processing techniques (malting, starch gelatinization), browning reactions (Maillard & caramelization), and identification of toxic (anti-nutritional) elements in cereals, millets, and pulses for informed decision-making in food sciences and nutrition. |  |
| Composition and Nutritional aspects of Cereals, Millets, and Pulse | 4 | 3 |
| Structure and composition of cereals, millets and pulses. | 2 | 2 |
| Malting, gelatinization of starch, types of browning- Maillard &  caramelization reactions. | 3 | 4 |
| Toxic(anti-nutritional) constituents of cereals, millets and pulses. | 2 | 2 |
| Unit 04 | Fruits and Vegetables | | | * Collaborative * Constructivist * Integrative * Inquiry based | * Quiz * Test * Laboratory * Presentation | To comprehensively understand the classification, composition, enzymatic browning mechanisms, pigment identification, and dietary fiber content of fruits and vegetables for informed utilization in nutrition and food sciences. | Students will be able to attain an extensive comprehension of fruit and vegetable classification, their composition, enzymatic browning processes, identification of pigments, and the significance of dietary fiber for informed decision-making in nutritional planning and food science applications. |  |
| Classification of fruits and vegetables, | 1 | 1 |
| General composition, | 1 | 1 |
| Enzymatic browning, | 1 | 1 |
| Names and sources of pigments | 1 | 1 |
| Dietary fibre. | 1 | 1 |
| Unit 05 | Compositional, Nutritional and Processing Aspects of Animal Products and Sea food-Milk | | | * Collaborative * Integrative * Inquiry based | * Assignments * Quiz * Test * Laboratory * Presentation * Lecture Notes | To comprehensively explore the definitions, compositions, classifications, spoilage mechanisms, and processing techniques of milk, meat, and fish to foster a detailed understanding of animal products and seafood in nutritional and processing aspects. | Students will be able to achieve a comprehensive understanding of milk's definition and chemical composition, meat classification and composition, as well as fish classification, aquaculture, composition, spoilage mechanisms, and processing techniques like smoking and canning in animal products and seafood, facilitating informed decision-making in food science and nutrition. |  |
| Definition of milk, chemical composition of milk. | 1 | 1 |
| Meat: Definition of carcass, concept of red meat and white meat, the composition of meat. | 1 | 2 |
|  |  |  |
| Fish - Classification of fish, aquaculture, composition of fish, characteristics of fresh fish, spoilage of fish microbiological, physiological, and biochemical, processing of fish-smoking and canning | 1 | 2 |
| Assessments | | IA Conducted- Yes  Units- 1,2,3,4,5  Marks- 50 | | Assignments- 3 Units  Unit- 3  Marks-10 Marks each | | Mock test/ Revision  Units- Class Test for 1 unit, Quiz for 4 unit and presentation of 5 unit  Marks- 5 marks each | | |

**DEPARTMENT OF FOOD TECHNOLOGY**

**Name of the Faculty: Ms. Swarnima Dey**

**Subject: Food Chemistry-I Class: B.Sc.(H) FT Year & Semester: IIIrd & Vth**

**TEACHING, LEARNING & EVALUATION PLAN**

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| S.No. | Topic & Coverage | Lecture sessions schedule | Lecture sessions held | Pedagogy | Activity | Unit Objective | Unit Learning outcome | Remark |
| Unit 01 | Definition of water in food. | 1 | 1 | * Integrative * Inquiry based | * Test * Presentation * Lecture Notes | To comprehend the significance of water in food, analyze the structures of water and ice, differentiate types of water in food systems, explore sorption phenomena, evaluate the relationship between water activity and packaging, and assess its impact on shelf-life in food products. | Student will be able to demonstrate comprehensive knowledge of water's role in food, comprehend water and ice structures, differentiate various types of water in food systems, understand sorption phenomena, analyze the relationship between water activity and packaging, and evaluate its influence on food shelf-life. |  |
| Structure of water and ice. | 2 | 1 |
| Types of water. | 2 | 2 |
| Sorption phenomenon. | 2 | 2 |
| Water activity and packaging. | 2 | 1 |
| Water activity and shelf-life. | 1 | 1 |
| Unit 02 | Classification of lipids. | 2 | 2 | * Constructive * Integrative * Inquiry based | * Quiz * Test * Laboratory * Presentation * Lecture Notes | To comprehend the classification of lipids, analyze their physical and chemical properties, investigate the impact of frying on fats, explore changes in fats and oils including rancidity and lipolysis, understand auto-oxidation mechanisms and prevention, and study the technology behind edible fats and oils including refining, hydrogenation, interesterification, and fat mimetics. | Student will be able to demonstrate a deep understanding of lipid classification, assess physical and chemical properties of lipids, analyze the effects of frying on fats, evaluate changes in fats and oils including rancidity and lipolysis, comprehend auto-oxidation processes and prevention methods, and apply knowledge of edible fats and oils technology including refining, hydrogenation, interesterification, and fat mimetics in food systems. |  |
| Physical properties- melting point, softening point, specific gravity, refractive index, smoke, flash and fire point, turbidity point. | 4 | 6 |
| Chemical properties-reichertmeissel value, polenske value, iodine value, peroxide value, Saponification value.  Effect of frying of fats. | 3 | 4 |
| Changes in fats & oils- rancidity, lipolysis, flavour reversion. Auto oxidation and its prevention. | 2 | 2 |
| Technology of edible fats and oils- Refining, Hydrogenation and Interesterification, Fat mimetics. | 3 | 4 |
| Unit 03 | Protein classification and structure. | 2 | 2 | * Constructivist * Integrative * Inquiry based | * Quiz * Test * Laboratory * Presentation * Lecture Notes | To understand protein classification and structure, explore food proteins from plant and animal sources, analyze protein properties through techniques like electrophoresis, sedimentation, amphoterism, and denaturation, and investigate functional properties including organoleptic attributes, solubility, viscosity, binding, gelation, emulsification, and foaming in food systems. | Students will be able to demonstrate comprehensive knowledge of protein classification, analyze the structures of food proteins from plant and animal sources, assess protein properties using techniques like electrophoresis and sedimentation, comprehend functional properties including organoleptic qualities, solubility, viscosity, binding, gelation/texturization, emulsification, and foaming in diverse food applications. |  |
| Nature of food proteins (plant and animal sources). | 2 | 2 |
| Properties of proteins (electrophoresis, sedimentation, amphoterism and denaturation). | 4 | 4 |
| Functional properties of proteins e.g. organoleptic, solubility, viscosity, binding, gelation/ texturization, emulsification, foaming) | 4 | 6 |
| Unit 04 | Classification (mono, loigo and poly saccharides). | 2 | 2 | * Collaborative * Constructivist * Integrative * Inquiry based | * Quiz * Test * Laboratory * Presentation | To understand the classification of carbohydrates (mono, oligo, and polysaccharides), analyze the structures of significant polysaccharides (starch, glycogen, cellulose, pectin, hemicelluloses, gums), explore chemical reactions involving carbohydrates such as oxidation, reduction, acid, and alkali reactions, and examine modified celluloses and starches in various food applications for enhanced functionality. | Students will be able to demonstrate a comprehensive understanding of carbohydrate classification (mono, oligo, and polysaccharides), analyze the structures of key polysaccharides (starch, glycogen, cellulose, pectin, hemicelluloses, gums), explore chemical reactions of carbohydrates including oxidation, reduction, acid, and alkali reactions, and examine modified celluloses and starches in various food applications. |  |
| Structure of important polysaccharides (starch, glycogen, cellulose, pectin, hemicelluloses, gums. | 4 | 5 |
| Chemical reactions of carbohydrates- oxidation, reduction, with acid & alkali. | 4 | 5 |
| Modified celluloses and starches. | 2 | 2 |
| Unit 05 | Structure, importance and stability. | 2 | 2 | * Collaborative * Integrative * Inquiry based | * Assignments * Quiz * Test * Laboratory * Presentation * Lecture Notes | To comprehend the structure, significance, and stability of food, differentiate between water-soluble and fat-soluble vitamins, define basic tastes and their chemical structures, and analyze food flavors including the role of flavor enhancers in food perception. | Students will be able to demonstrate a comprehensive understanding of food structure, stability, and importance, differentiate between water-soluble and fat-soluble vitamins, define basic tastes and their chemical structures, and analyze food flavors including the role of flavor enhancers in food perception. |  |
| Water soluble vitamins. | 2 | 2 |
| Fat soluble vitamins. | 2 | 2 |
| Definition and basic tastes. | 2 | 2 |
| Chemical structure and taste. | 2 | 2 |
| Description of food flavours, flavour enhancers. | 2 | 2 |
| Assessments | | IA Conducted- Yes  Units-5  Marks-50 | | Assignments- 3  Unit- 3  Marks-50 | | Mock test/ Revision  Units- Class Test for 1 unit, Quiz for 4 unit and presentation of 5 unit  Marks- 5 marks each | | |