| **FOOD SCIENCE PRINCIPLES** | |
| --- | --- |
| **Course Code: 22FTBS101** | **L T P : 3 1 4** |
| **Credits: 6** |  |
| **Prerequisite: Nil** | |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Appreciate the history and evolution of food processing.

CLO2: Understand different plant and animal food.

CLO3: Have knowledge of the structure, composition, nutritional quality.

CLO4: Get an overview of some of the methods of processing of plant and animal foods.

| **FOOD SCIENCE PRINCIPLES LAB** | |
| --- | --- |
| **Code: 22FTBS151** | **L T P : 0 0 4** |
| **Credits: 2** |  |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Ascertain the influence of different reactions on food products.

CLO2: Understand the principle different reactions which different types of food.

CLO3: Perform basic quality checks for meat and poultry products.

| **FUNDAMENTALS OF FOOD TECHNOLOGY** | |
| --- | --- |
| **Course Code: 22FTBS102** | L T P : 3 1 4 |
| **Credits: 6** |  |
| **Prerequisite: Nil** | |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Gain insight into the structure, composition, nutritional quality and post-harvest changes in various plant foods

CLO2: Learn the structure and composition of various foods.

CLO3: Know the history and evolution of food processing.

CLO4: Comprehend some of the processing methods associated with plant and animal foods.

| **FUNDAMENTALS OF FOOD TECHNOLOGY LAB** | |
| --- | --- |
| **Code: 22FTBS152** | L T P : 0 0 4 |
| **Credits: 2** |  |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Understand basic estimation techniques.

CLO2: Understand the principle behind the estimation techniques.

CLO3: Perform estimation techniques with confidence.

| **FOOD AND NUTRITION** | |
| --- | --- |
| **Course Code: 22FTBS201** | L T P : 3 1 4 |
| **Credits: 6** |  |
| **Prerequisite: Nil** | |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Appreciate the relationship between food, nutrition and health.

CLO2: Explain digestion, absorption, functions and food sources of various nutrients.

CLO3: Understand the concept of balanced diets and menu planning.

CLO4: Assess nutritional status of adults.

| **FOOD AND NUTRITION LAB** | |
| --- | --- |
| **Code: 22FTBS251** | L T P : 0 0 4 |
| **Credits: 2** |  |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Prepare basic meal charts.

CLO2: Understand the concept nutritional labelling.

CLO3: Understand the science behind nutritional food preparation and different cooking methods.

| **FOOD PRESERVATION TECHNOLOGY** | |
| --- | --- |
| **Course Code: 22FTBS202** | L T P : 3 1 4 |
| **Credits: 6** |  |
| **Prerequisite: Nil** | |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Apprehend the importance of biological agents in food preservation.

CLO2: Provide insights on different preservation technologies.

CLO3: Understanding of the concept of different processing and preservation technologies.

CLO4: Comprehend important application of various preservation methods in food industries.

| **FOOD PRESERVATION TECHNOLOGY LAB** | |
| --- | --- |
| **Code: 22FTBS252** | L T P : 0 0 4 |
| **Credits: 2** |  |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Recognize different food preservation methods.

CLO2: Understand the quality characteristics of different food products.

CLO3: Perform basic food preservation methods.

| **PRINCIPLES OF FOOD PROCESSING** | |
| --- | --- |
| **Course Code: 22FTBS301** | L T P : 3 1 4 |
| **Credits: 6** |  |
| **Prerequisite: Nil** | |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Explain Cold preservation, Freezer types and functioning.

CLO2: Understand Dehydration, Dryer types and functioning.

CLO3: Know about Irradiation Plant layout, E beam and Microwave heating.

CLO4: Recognise the overall requirements of food industries.

| **PRINCIPLES OF FOOD PROCESSING LAB** | |
| --- | --- |
| **Code: 22FTBS351** | L T P : 0 0 4 |
| **Credits: 2** |  |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Understand different methods of food processing.

CLO2: Be familiar with the concept food packaging.

CLO3: Learn the science behind different methods and the changes food undergoes.

| **TECHNOLOGY OF FRUIT, VEGETABLE AND PLANTATION CROPS** | |
| --- | --- |
| **Course Code: 22FTBS302** | L T P : 3 1 4 |
| **Credits: 6** |  |
| **Prerequisite: Nil** | |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Understand maturity indices of fruits and vegetables.

CLO2: Recognize the concept of quality in relation to fruit and vegetable based products.

CLO3: Apprehend the processing and preservation of fruits and vegetables using various techniques.

CLO4: Learn processing of plantation crops.

| **TECHNOLOGY OF FRUITS, VEGETABLES AND PLANTATION CROPS LAB** | |
| --- | --- |
| **Code: 22FTBS352** | L T P : 0 0 4 |
| **Credits: 2** |  |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Understand influence of different reactions in food products.

CLO2: Learn the principle of different reactions which undergo in different fruits and vegetable products.

CLO3: Perform basic quality checks and adulteration checks for fruit and vegetable products.

| **DAIRY TECHNOLOGY** | |
| --- | --- |
| **Course Code: 22FTBS303** | L T P : 3 1 4 |
| **Credits: 6** |  |
| **Prerequisite: Nil** | |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Recognise the importance of dairy industry.

CLO2: Mention the various properties and composition of milk.

CLO3: Comprehend technology of manufacturing of various products like butter, ghee, flavored milk, yoghurt, dahi, shrikhand, ice cream, cheese, channa, paneer, condensed milk and milk powder.

CLO4: State techniques that can be used for manufacturing of various value added dairy products.

| **DAIRY TECHNOLOGY LAB** | |
| --- | --- |
| **Code: 22FTBS353** | L T P : 0 0 4 |
| **Credits: 2** |  |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Perform basic analysis for dairy and seafood products.

CLO2: Understand the concept behind different processing methods for dairy and seafood products.

CLO3: Prepare basic dairy and seafood products.

| **MICROBIOLOGY OF FOOD** | |
| --- | --- |
| **Course Code: 22FTBS401** | L T P : 3 1 4 |
| **Credits: 6** |  |
| **Prerequisite: Food Preservation Technology** | |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Understand the important genera of microorganisms associated with food and their characteristics, their growth pattern and parameters.

CLO2: Provide insights about the beneficial role of microorganisms and different types of fermented foods.

CLO3: Identify the role of microorganisms in food borne diseases and control measures.

CLO4: Grasp the laboratory techniques to detect, quantify, and identify microorganisms in foods.

| **MICROBIOLOGY OF FOOD LAB** | |
| --- | --- |
| **Code: 22FTBS451** | L T P : 0 0 4 |
| **Credits: 2** |  |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Understand food microbiology.

CLO2: Know the need for different methods of microbial detection.

CLO3: Perform basic microbial detection methods.

| **TECHNOLOGY OF CEREAL PULSES AND OILSEEDS** | |
| --- | --- |
| **Course Code: 22FTBS402** | L T P : 3 1 4 |
| **Credits: 6** |  |
| **Prerequisite: Nil** | |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Know the basics of milling operations.

CLO2: Understand basic composition & structure of food grain.

CLO3: Learn processing of food grains into value added products.

CLO4: State the principle of alcoholic beverage preparation.

| **TECHNOLOGY OF CEREALS, PULSES & OILSEEDS LAB** | |
| --- | --- |
| **Code: 22FTBS452** | L T P : 0 0 4 |
| **Credits: 2** |  |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Understand different technologies related to cereals and pulses.

CLO2: Recognise the quality characteristics associated with cereals and pulses.

CLO3: Perform basic testing methods for cereals and pulses.

| **FOOD ENGINEERING** | |
| --- | --- |
| **Course Code: 22FTBS403** | L T P : 3 1 4 |
| **Credits: 6** |  |
| **Prerequisite: Nil** | |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Understand basics of designing of food plant and storage system.

CLO2: Comprehend the principle of unit operations.

CLO3: Apply basic principles of refrigeration, freezing, fluid flow, heat and mass transfer, steam, psychrometrics etc.

CLO4: Solve numerical and problems relating to food engineering.

| **FOOD ENGINEERING LAB** | |
| --- | --- |
| **Code: 22FTBS453** | L T P : 0 0 4 |
| **Credits: 2** |  |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Know about different concepts of food engineering.

CLO2: Understand Psychrometrics and its application in food industry.

CLO3: Perform basic analysis.

| **MEAT, POULTRY AND EGG TECHNOLOGY** | |
| --- | --- |
| **Course Code: 22FTBS501** | L T P : 3 1 4 |
| **Credits: 6** |  |
| **Prerequisite: Nil** | |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Understand the need and importance of livestock, egg and poultry industry.

CLO2: Recognise the technology behind preparation of various animal food products and by-product utilization.

CLO3: State egg production practices and egg preservation methods.

CLO4: Know factors affecting egg quality and measures of egg quality.

| **MEAT, POULTRY AND EGG TECHNOLOGY LAB** | |
| --- | --- |
| **Code: 22FTBS551** | L T P : 0 0 4 |
| **Credits: 2** |  |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Perform basic analysis for animal products.

CLO2: Appreciate the concept behind different processing methods for animal products.

CLO3: Understand the science behind production of animal products.

| **FOOD CHEMISTRY-I** | |
| --- | --- |
| **Course Code: 22FTBS502** | L T P : 3 1 4 |
| **Credits: 6** |  |
| **Prerequisite: Nil** | |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Understand and describe the general chemical structures of the major components of foods.

CLO2: Explain observed physical properties and reactivity of major food components.

CLO3: Predict how processing conditions are likely to change the reactivity of food components.

CLO4: To predict how changes in overall composition are likely to change the reactivity of individual food.

| **FOOD CHEMISTRY I LAB** | |
| --- | --- |
| **Code: 22FTBS552** | L T P : 0 0 4 |
| **Credits: 2** |  |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Know basics of food chemistry.

CLO2: Understand influence of food chemistry on food product development.

CLO3: Perform basic estimation methods for analysis of different parameters.

| **FOOD CHEMISTRY-II** | |
| --- | --- |
| **Course Code: 22FTBS601** | L T P : 3 1 4 |
| **Credits: 6** |  |
| **Prerequisite: Food Chemistry-I** | |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Understand chemistry and interactions of food components.

CLO2: Know the role of enzymes.

CLO3: Determine approaches that may be used to control the reactivity of food components.

CLO4: Apprehend the concept of New Product Development.

| **FOOD CHEMISTRY II LAB** | |
| --- | --- |
| **Code: 22FTBS651** | L T P : 0 0 4 |
| **Credits: 2** |  |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: State the basics of food chemistry.

CLO2: Understand influence of food chemistry on food product development.

CLO3: Perform basic estimation methods for analysis of different parameters.

| **FUNDAMENTALS OF SENSORY EVALUATION** | |
| --- | --- |
| **Course Code: 22FTBS602** | L T P : 3 1 4 |
| **Credits: 6** |  |
| **Prerequisite: Nil** | |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Apply the principles of sensory science.

CLO2: Relate sensory to physical properties of food.

CLO3: Able to analyse colour, flavour, texture and other sensory characteristics of food for quality assurance.

CLO4: Able to measure consumer perception and acceptance of food products.

| **FUNDAMENTALS OF SENSORY EVALUATION LAB** | |
| --- | --- |
| **Code: 22FTBS652** | L T P : 0 0 4 |
| **Credits: 2** |  |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Understand different methods of sensory evaluation.

CLO2: Know the concept behind sensory evaluation.

CLO3: Perform basic sensory evaluation tests.

**DISCPLINE SPECIFIC ELECTIVES**

| **FOOD SUPPLY CHAIN MANAGEMENT** | |
| --- | --- |
| **Course Code: 22FTBS503** | L T P : 3 1 4 |
| **Credits: 6** |  |
| **Prerequisite: Nil** | |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Appreciate basics of food supply chain.

CLO2: Understand the strategic advantages of well- developed food supply chain.

CLO3: Apply basics to real life situation.

CLO4: Comprehend the need of a well-defined supply chain network.

| **FOOD SUPPLY CHAIN MANAGEMENT LAB** | |
| --- | --- |
| **Code: 22FTBS553** | L T P : 0 0 4 |
| **Credits: 2** |  |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Prepare basic models related to the field.

CLO2: Understand the concept behind value chain development.

CLO3: Compare different supply chain systems.

| **FOOD PACKAGING** | |
| --- | --- |
| **Course Code: 22FTBS504** | L T P : 3 1 4 |
| **Credits: 6** |  |
| **Prerequisite: Nil** | |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Comprehend the overview of the scientific and technical aspects of food packaging.

CLO2: Understand packaging machinery systems, testing,

CLO3: Distinguish between multiple packaging materials.

CLO4: Understand overall food packaging laws and regulations.

| **FOOD PACKAGING LAB** | |
| --- | --- |
| **Code: 22FTBS554** | L T P : 0 0 4 |
| **Credits: 2** |  |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Mention scientific and technical aspects of food packaging.

CLO2: Understand the science behind different requirements for food packaging.

CLO3: Perform basic material tests for food packaging.

| **NUTRACEUTICALS AND FUNCTIONAL FOODS** | |
| --- | --- |
| **Course Code: 22FTBS505** | L T P : 3 1 4 |
| **Credits: 6** |  |
| **Prerequisite: Nil** | |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Identify and appreciate the types of nutraceutical and functional foods.

CLO2: Appreciate the health promoting potential of nutraceuticals and functional foods.

CLO3: Understand the nutraceutical and functional food market.

CLO4: Comprehend the safety issues and consumer acceptance of nutraceutical and functional foods.

| **NUTRACEUTICAL AND FUNCTIONAL FOODS LAB** | |
| --- | --- |
| **Code: 22FTBS555** | L T P : 0 0 4 |
| **Credits: 2** |  |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Recognise the potential market of various nutraceuticals and functional foods.

CLO2: Understand the science behind the creation of different nutraceutical and functional foods.

CLO3: Appreciate the role of nutraceutical and functional foods in human health.

| **FOOD SAFETY AND QUALITY** | |
| --- | --- |
| **Course Code: 22FTBS603** | L T P : 3 1 4 |
| **Credits: 6** |  |
| **Prerequisite: Nil** | |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Identify food safety issues and types of hazards.

CLO2: Apply concepts of Food Safety Management to real life situations.

CLO3: Comprehend the need for well-defined quality management system.

CLO4: Understand the need and importance of food additives.

| **FOOD SAFETY AND QUALITY LAB** | |
| --- | --- |
| **Code: 22FTBS653** | L T P : 0 0 4 |
| **Credits: 2** |  |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Understand the concept of food safety, types of hazards and their control measures.

CLO2: Comprehend the importance of Quality Systems and Food Regulations.

CLO3: Detect various routes of contamination of food, identify and prevent potential sources.

| **FOOD FERMENTATION** | |
| --- | --- |
| **Course Code: 22FTBS604** | L T P : 3 1 4 |
| **Credits: 6** |  |
| **Prerequisite: Nil** | |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Comprehend the basics of fermentation.

CLO2: Understand the concept behind the reactor design.

CLO3: Select media for different microbial growth.

CLO4: Know the process behind the different fermented food products.

| **FOOD FERMENTATION LAB** | |
| --- | --- |
| **Code: 22FTBS654** | L T P : 0 0 4 |
| **Credits: 2** |  |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Prepare basic fermented food products.

CLO2: Understand the concept behind different fermented food products.

CLO3: Recognize role of microorganisms in preparation of fermented food products.

| **FLAVOR CHEMISTRY & TECHNOLOGY** | |
| --- | --- |
| **Course Code: 22FTBS605** | L T P : 3 1 4 |
| **Credits: 6** |  |
| **Prerequisite: Nil** | |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Understand the basics involved in flavour technology.

CLO2: Understand the flavour perception.

CLO3: Comprehend the mechanisms involved in flavour production.

CLO4: Perform analysis of different flavours.

| **FLAVOUR CHEMISTRY AND TEHNOLOGY LAB** | |
| --- | --- |
| **Code: 22FTBS655** | L T P : 0 0 4 |
| **Credits: 2** |  |
| **Prerequisite: Nil** |  |

**COURSE LEARNING OUTCOMES (CLO)**

CLO1: Understand chemical stimuli involved in flavour perception.

CLO2: State the mechanisms of flavour formation.

CLO3: Identify role of flavours in food product development.

**TEACHING, LEARNING & EVALUATION PLAN**

| **Academic Session : 2023-2024** | |
| --- | --- |
| **Course Name: Food Nutrition** | **Course Code: 22FTBS201** |
| **Faculty Name: Ms. Swarnima Dey** | **Programme: B.Sc. (H) Food Technology** |
| **Year: 1st** | **Semester: IInd** |

| S.No. | Topic & Coverage | Lecture sessions schedule | Lecture sessions held | Pedagogy | Activity | Unit Objective | Unit Learning outcome | Remark |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Unit 01 | Basic terms used in study of food and nutrition. Methods of assessment of nutritional status. Functions of food-physiological, psychological and social. Understanding relationship between food, nutrition and health. | 6 | 5 | * Integrative * Inquiry based | * Quiz * Test * Presentation * Lecture Notes | Learn the basic definitions and concepts of Nutrition along with its functions. | Knowledge about the definitions and concepts of Nutrition along with its functions. | Ok |
| Unit 02 | Classification, digestion, absorption, functions, dietary sources, RDA, clinical manifestations of deficiency and excess of the following in brief: Energy, Carbohydrates, lipids and proteins. | 14 | 14 | * Constructivist * Integrative * Inquiry based | * Test * Laboratory * Presentation * Lecture Notes | Learn to describe and study the classification, digestion, absorption, functions, dietary sources, RDA and clinical manifestations of macro-nutrients. | Knowledge about the classification, digestion, absorption, functions, dietary sources, RDA and clinical manifestations of macro-nutrients. | Ok |
| Unit 03 | Fat soluble vitamins-A, D, E and K. Water soluble vitamins – thiamine, riboflavin, niacin, pyridoxine, folate, vitamin B12 and vitamin C. Minerals – calcium, iron, iodine, fluorine, copper and zinc. | 14 | 15 | * Constructivist * Integrative * Inquiry based | * Assignments * Laboratory * Presentation * Lecture Notes | Learn to describe and study the classification, digestion, absorption, functions, dietary sources, RDA and clinical manifestations of micro-nutrients. | Knowledge about the classification, digestion, absorption, functions, dietary sources, RDA and clinical manifestations of micro-nutrients. | Ok |
| Unit 04 | Food Groups. Concept of Balanced Diets. Healthy and Fad Diets. Factors affecting meal planning. Understanding specific considerations for planning meal for different groups of people. Nutrition labelling on foods, Food Safety and Standards (Labelling And Display) Regulations, 2020, Codex guidelines for health and nutrition claims. | 14 | 13 | * Collaborative * Constructivist * Integrative * Inquiry based | * Quiz * Assignments * Laboratory * Presentation * Lecture Notes | Learn different terminologies and concepts of meal planning along with its specifications and guidelines according to law. | Knowledge about different terminologies and concepts of meal planning along with its specifications and guidelines according to law. | Ok |
| Unit 05 | Dry, moist, frying and microwave cooking – Advantages, disadvantages. Effect of various methods of cooking on foods and nutrients. Preventing nutrient losses. | 12 | 8 | * Collaborative * Integrative * Inquiry based | * Assignments * Laboratory * Presentation * Lecture Notes | Learn about various methods of cooking food, their advantages and disadvantages. Also the preservation methods to stop nutrient losses. | Knowledge about various methods of cooking food, their advantages and disadvantages. Also the preservation methods to stop nutrient losses. | Ok |