INTEGRAL UNIVERSITY
DEPARTMENT OF BIOENGINEERING

B.TECH FOOD TECHNOLOGY

PROGRAM SPECIFIC OUTCOMES (PSO):

PSO1: The student will be able to apply knowledge of food technology with a sound comprehension of food sciences and allied disciplines which enable them to understand the emerging techniques and advanced food engineering concepts

PSO2: An ability to acquire proficiency in solving engineering problems related to modern food sector/industry, Food spoilage and adulteration along with focus on the importance of food safety and hygiene of nutritious processed food.

PSO3: An ability to work in the domain of Food processing, quality assurance and quality control in private or government organisations and research laboratories to design or process food products as per the needs and specifications, or can also emerge as an entrepreneur.

COURSE OBJECTIVES

PROGRAMME: B.TECH. FOOD TECHNOLOGY 3RD SEMESTER

COURSE: INDUSTRIAL ECONOMICS, PRINCIPLES OF MANAGEMENT & IPR

COURSE CODE : BM-229

COURSE OBJECTIVES:

The basic objective of this course is to provide fundamental knowledge about Principles of Management, Industrial Economics & Intellectual Property Rights. This will help the students in analyzing the current economic scenario as well as give the required skills to develop and protect the ideas & skills they possess.

COURSE OUTCOMES: ***After completion of the course, a student will be able to achieve these outcomes***

COURSE OUTCOME (CO)	DESCRIPTION
CO1	At the end of the course students would have learnt about the mechanisms by which a human body interacts with a pathogenic microbe & how it eliminates it.
CO2	Students will also familiarize themselves with immunopathology and immunotherapy.
CO3	At the end of this course, students should be able to synthesize key concepts in immunology, understand the way in which different components of the immune system interact in a coordinated manner to fight infection and discuss the way the immune system reacts to various kinds of infectious agents.
CO4	The student will gain basic knowledge of IPR (patent, design, copyright and Geographical indication). Significance of IPR and how to obtain patent or filing process of patent.
CO5	Students also will gain the fundamental aspects of Safety guidelines of rDNA research; Containment facilities and its disposal; Radiation hazards; Safety concerns about transgenics: Environmental, Health, Economic. Bioethics: Introduction, necessity and limitation; Ethical conflicts and applications of biosafety in different laboratory nad research unit.

COURSE: FOOD MICROBIOLOGY

COURSE CODE : BE-231

COURSE OBJECTIVES:

To acquaint with the basic knowledge of microbiology of foods and impart knowledge which would be useful to the students for industrial job after they complete the program and go to practical field.

COURSE OUTCOME (CO)	DESCRIPTION
CO1	The learner will gain basic knowledge of food and its microbiological aspects in term of quality and spoilage activity along with structural composition, nutrient value and biological value and their mechanisms.
CO2	Learners also will gain the fundamental aspects of bacterial growth by using different media and its role in the sustainable growth of bacteria. Aware about media preparation and culture characteristic of bacteria which grow on that media as food by utilizing food nutrient as substrates.
CO3	Learners would have acquired basic knowledge of food properties like intrinsic and extrinsic parameter and its significance of spoilage mechanism in food.
CO4	Understand the application of fermentation and their importance in the development of fermented food along with the biological and nutritive value of fermented food developed as yoghurt, cheese, fruits and vegetable, meat and meat product, egg and fish in daily life..
CO5	Know about the symptoms as well as detection of food borne diseases along with fundamental knowledge of toxins produced by Staphylococcus, Clostridium, Aspergillus.

COURSE OUTCOMES: ***After completion of the course, a student will be able to achieve these Outcomes.***

COURSE: FOOD ENGINEERING I

COURSE CODE : BE-232

COURSE OBJECTIVES:

The aim of this course id to introduce the student to the basic concepts of fluid mechanics, diffusional mass transfer, mass transfer coefficients, and different mass transfer operations like liquid extraction, gas absorption, filtration, leaching and distillation.

COURSE OUTCOMES: ***After completion of the course, a student will be able to achieve these outcomes***

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Knowledge of basic principles of fluid mechanics and its applications.
CO2	Understand the basic principles of diffusional mass transfer
CO3	Have knowledge of concept of mass transfer coefficients and driving force.
CO4	Understand the basic principle of various mass transfer operations like liquid extraction, gas absorption, filtration, leaching and distillation.

COURSE: FOOD CHEMISTRY

COURSE CODE : BE-233

COURSE OBJECTIVES:

The core competency of this course is for students to differentiate chemical interactions and reactions of food components and their effect on sensory, nutritional, and functional properties of foods, and how processing influences these properties.

COURSE OUTCOMES: ***After completion of the course, a student will be able to achieve these outcomes***

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Students are expected to understand water's influence on food stability in a broader context.
CO2	To understand the properties of different carbohydrate components and interactions among these components to regulate the specific quality attributes of food systems.
CO3	Students are expected to understand the role of proteins /enzymes in foods and be able to control the major chemical and biochemical (enzymatic) reactions that influence food quality with emphasis on food industry applications.
CO4	To understand the chemical composition of lipids, their physical properties, methods to modify the fatty acid and triacylglycerol composition, tendency of lipids to undergo oxidative deterioration, and the role of lipids in health and disease.
CO5	Understanding of the chemical and physical factors that influence vitamin, mineral and pigment retention and bioavailability in foods.

COURSE: FOOD CHEMISTRY LAB

COURSE CODE : BE-235

COURSE OBJECTIVES:

The lab is designed to train the students in understanding various chemical testing parameters including estimation and detection of nutritional ingredients in food products.

COURSE OUTCOMES: ***After completion of the course, a student will be able to achieve these outcomes***

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Understand the biochemical analysis in terms of estimation of proximate analysis of foods.
CO2	Understand the biochemical analysis in terms of estimation of nutritional value of foods.
CO3	Understand the biochemical analysis in terms of estimation of physiochemical characteristics of foods.

B.TECH. FOOD TECHNOLOGY 4th SEMESTER

COURSE: FOOD INFORMATICS

COURSE CODE : BE-237

COURSE OBJECTIVES:

The course is aimed to enable students to understand need and applications of food and nutrition science databases. The course emphasizes data collection and organization in food and nutrition science databases data retrieval tools and their applications. The course deals carbohydrate, protein, fat and lipid, vitamins and minerals databases their access and applications. The course describes file formats for the visualization of macromolecules and smaller molecules data in the food items at *in silico* platform. The course highlights the Interaction studies of food molecules with various chemical constituents inside the body.

COURSE OUTCOMES (CO): ***After completion of the course, a student will be able to achieve these outcomes***

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Understand the need and applications of food and nutrition science databases.
CO2	Explain data collection and organization in food and nutrition science databases data retrieval tools and their applications.
CO3	Understand carbohydrate, protein, fat and lipid, vitamins and minerals databases their access and applications.
CO4	Describe file formats for the visualization of macromolecules and smaller molecules data in the food items at in silico platform.
CO5	Explain the interaction studies of food molecules with various chemical constituents inside the body.

COURSE: FOOD ENGINEERING II

COURSE CODE : BE-238

COURSE OBJECTIVES:

The aim of this course is to develop concepts of heat transfer in food processing and build the understanding of basic principles of freezing, drying and other thermal processing.

COURSE OUTCOMES (CO): ***After completion of the course, a student will be able to achieve these outcomes***

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Understand the basic modes of heat transfer in foods.
CO2	Interpret and analyze forced and free convection heat transfer.
CO3	Formulate and solve convective heat transfer problems.
CO4	Able to calculate freezing time and freezing rate.
CO5	Understand mechanisms of moisture removal in foods.

COURSE: PRINCIPLES OF FOOD PRESERVATION AND PROCESSING

COURSE CODE : BE-239

COURSE OBJECTIVES:

The primary objective of this subject is to impart knowledge of various preservation techniques and their use to increase the shelf life of foods.

COURSE OUTCOMES: ***After completion of the course, a student will be able to achieve these outcomes***

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Understand methods of inactivation of micro-organisms at high temperature.
CO2	Apprehend ways of restriction of growth of microorganisms at low temperature.
CO3	To understand the methods of preservation by food additives
CO4	To understand the methods of processing and preservation by advanced thermal and non-thermal techniques.
CO5	To understand preservation of foods by fermentation and hurdle technology.

COURSE: ENERGY UTILIZATION IN FOOD INDUSTRY

COURSE CODE : BE-240

COURSE OBJECTIVES:

The energy utilization in food industry recognizes the need for the possibility to exchange different ways of energy sources and their proper utilization in different industries with optimum manner. The basic knowledge of this subject paper is very useful for student in term of how they save the energy and run the industry in economic mode.

COURSE OUTCOMES: ***After completion of the course, a student will be able to achieve these outcomes***

COURSE OUTCOME (CO)	DESCRIPTION
CO1	The learners will gain basic knowledge of energy its norms and scenario; energy auditing, data collection and analysis for energy conservation in food processing industries energy sources, Applications of renewable energy in food industry.
CO2	The learners also will gain the fundamental aspects of biomass as an alternate source of energy along with its merits and demerits.
CO3	The learners would have acquired basic knowledge of solar energy and its application in Indian food industry and other heavy industry along others alternative sources of energy.
CO4	Understand the application of energy audit and its management with a case study.
CO5	Know about the technique applied for accounting methods of energy and its economic uses.

COURSE: INDUSTRIAL FUELS AND PROCESS CALCULATIONS

COURSE CODE : BE241

COURSE OBJECTIVES:

To build up knowledge of the concepts and theories of a of classical fuel combustion. To develop understanding of the basic principles and concepts of advanced fuel combustion and control process. To enable the students to perform material and energy balances of Unit Operations/Unit Processes in a relevant Industry.

COURSE OUTCOMES (CO): ***After completion of the course, a student will be able to***

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Identify different types of fuels along with their utilities.
CO2	Perform material balances on simple and complex processes
CO3	Perform energy balances on simple and complex processes

COURSE NAME: DAIRY TECHNOLOGY

COURSE CODE : BE-242

COURSE OBJECTIVES:

To impart knowledge of principles of processing of milk and milk products.

COURSE OUTCOMES: ***After completion of the course, a student will be able to achieve these outcomes***

COURSE OUTCOME (CO)	DESCRIPTION
CO1	The Learner will gain basic knowledge of milk and physicochemical aspects along with procurement and transportation methodology and national and international standards.
CO2	The Learner also will gain the fundamental aspects of testing of milk quality along with sources of contamination and how the milk spoiled.
CO3	The Learner would have acquired basic knowledge of hygiene, cleaning procedures and application methodology of Pasteurization, standardization, toning, homogenization and cream separation from milk.
CO4	Understand the application and technology applied for the development of dairy products along with ghee preparation and other milk based dairy products in economic way.
CO5	Know about the Sterilized flavored milk, UHT milk, Aseptic packaging and storage

COURSE: FOOD PRESERVATION AND PROCESSING LAB

COURSE CODE : BE-243

COURSE OBJECTIVES:

The lab is designed to train the students in understanding various preservation techniques, shelf life and various packaging techniques of foods.

COURSE OUTCOMES: ***After completion of the course, a student will be able to achieve these outcomes***

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Understand the role of processing in terms of shelf life, safety, nutritional and economic value of fruit and vegetables.
CO2	Assess the role in pre- and post-harvest changes in fruits and vegetables on product quality.
CO3	Gain knowledge on production, preservation and packaging of jam, jelly, marmalade, pickles, and candies.

COURSE: MILK AND MILK PRODUCT TECHNOLOGY LAB

COURSE CODE : BE-244

COURSE OBJECTIVES:

The lab is designed to train the students in understanding various quality testing parameters including microbiological and biochemical analysis of various dairy products.

COURSE OUTCOMES: ***After completion of the course, a student will be able to achieve these outcomes***

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Understand the microbiological analysis in terms of shelf life, safety, nutritional and economic value of dairy products.
CO2	Understand role in pre- and post safety in dairy product quality.
CO3	Gain knowledge on production of dairy and dairy products such as ice creams, Paneer, khoa etc including their quality assurance

B.TECH. FOOD TECHNOLOGY 5th SEMESTER

COURSE: UNIT OPERATIONS IN FOOD PROCESSING

COURSE CODE : BE-331

COURSE OBJECTIVES:

This course is aimed to impart basic knowledge about components of different process equipment and unit operation associated with them**.**

COURSE OUTCOMES: ***After completion of the course, a student will be able to achieve these outcomes***

COURSE OUTCOME (CO)	DESCRIPTION
CO 1	Be well versed with food process engineering calculations
CO 2	Explain the principles of different types of material handling equipments and their application.
CO 3	Acquire knowledge on importance of size reduction and energy requirement
CO 4	Explain mechanism of crystallization, distillation and leaching process
CO 5	Explain the principles of mixing and homogenization.

COURSE: POST-HARVEST PHYSIOLOGY, HANDLING, AND STORAGE OF FRUITS AND VEGETABLES

COURSE CODE : BE-332

COURSE OBJECTIVES:

This course deals with post-harvest physiology of horticultural commodities, e.g. tuber, fruits and vegetables. Control of post-harvest losses (Prevention of moisture losses, mechanical damage and injuries, microbial infection etc). Post-harvest quality changes and their evaluation in fruits and vegetables. Refrigeration and cooling systems.

COURSE OUTCOMES: ***After completion of the course, a student will be able to achieve these outcomes***

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Developments and current status of fruits and vegetables storage and processing
CO2	Role of fruits and vegetables in human nutrition and diet
CO3	Physico-chemical composition of fruits and vegetables and the effect of processing on nutrients and pigments.
CO4	Value addition to fruits and vegetables, processing and preservation

COURSE: CEREAL AND LEGUME TECHNOLOGY

COURSE CODE : BE-333

COURSE OBJECTIVES:

This subject is aimed to impart the basic knowledge about the nutritional value and properties of different cereals and legumes.

COURSE OUTCOMES: ***After completion of the course, a student will be able to achieve these outcomes***

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Understand basic composition & structure of food grain.
CO2	Understand the basics of milling operations.
CO3	Learn processing of food grains into value added products.
CO4	Learn to manage by products utilization.

COURSE NAME: DAIRY PRODUCT TECHNOLOGY

COURSE CODE : BE-334

COURSE OBJECTIVES:

The objective is to impart valuable training and guidance to the students on packaging, processing, transportation, storage and distribution of dairy products.

COURSE OUTCOMES: ***After completion of the course, a student will be able to achieve these outcomes***

COURSE OUTCOME (CO)	DESCRIPTION
CO1	The student will gain basic knowledge of technology and methods for development of various dairy products.
CO2	Students also will gain the fundamental aspects of Cream, butter, margarine, spreads and cheeses- Handling of cream, processing steps along with chemistry and microbiology of cream and its application in non-dairy products as well as nutritive value of cream based milk products.
CO3	Student would have acquired basic knowledge of phsico-chemical nature of ice cream and microbiology of ice creams. Scope if Indian dairy products how produced or manufacture of Dahi, Srikand, Panir, Ghee, Khoa and Channa in simple ways without contaminations.
CO4	Understand the application of hygiene and sanitation and CIP and COP scheduling, deposit formation, cleaning and disinfection. And legal standards for milk and milk products in dairy industry
CO5	Know about the symptoms as well as detection of food borne diseases along with fundamental knowledge of toxins produced by Staphylococcus, Clostridium, Aspergillus.

COURSE: FOOD ADDITIVES AND INGREDIENTS

COURSE CODE : BE-335

COURSE OBJECTIVES:

The objective is to impart knowledge about various categories of food additives their functions, permissible limits to be used in various food products.

COURSE OUTCOMES: ***After completion of the course, a student will be able to achieve these outcomes***

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Understand the role of food additives in manufacturing of food products.
CO2	Have the knowledge regarding chemistry, applications, and International numbering system for Food Additives
CO3	Comprehend the effects of processing on flavor generation, extraction of flavours and colours and their regulatory effects
CO4	Ingredients and their chemistry used in food production

COURSE: CEREAL AND LEGUME TECHNOLOGY LAB

COURSE CODE : BE-336

COURSE OBJECTIVES:

To provide the knowledge about the preparation and estimation of various quality characteristics of cereal and legume based products.

COURSE OUTCOMES: ***After completion of the course, a student will be able to achieve these outcomes***

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Identify and explain baking terms, ingredients, equipment and tools.
CO2	Learn different types of bakery products and their quality.
CO3	Impart training on baking and confectionery methods.

COURSE: DAIRY PRODUCT TECHNOLOGY LAB

COURSE CODE : BE-337

COURSE OBJECTIVES:

The lab is designed to train the students in understanding manufacturing principles and various quality testing parameters including microbiological and biochemical analysis of various dairy products.

COURSE OUTCOMES: ***After completion of the course, a student will be able to achieve these outcomes***

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Understand role of various ingredients in the manufacturing of various dairy products.
CO2	To determine Quality evaluation of various dairy products
CO3	Gain knowledge on production of dairy and dairy products such as ice creams, Paneer, khoa etc including their quality assurance

COURSE: FOOD BIOTECHNOLOGY

COURSE CODE : BE-338

COURSE OBJECTIVES:

As a food biotechnologist, it is necessary to know that the new varieties of foods and crops are developed. It is also necessary to know how to develop hybrid and GM food as well as well as the patenting issues related to the use of technology. The content of this paper is, therefore, very relevant for the B Tech. Food tech students

COURSE OUTCOMES: ***After completion of the course, a student will be able to achieve these outcomes***

COURSE OUTCOME (CO)	DESCRIPTION
CO1	The student will gain basic knowledge of GMOs/GMCs, Role of microorganism in food biotechnology and their various applications in food sector.
CO2	Students also will gain the fundamental aspects of r-DNA technology and aware about gene cloning methodology and their significance in different biotechnological research centre.
CO3	Student would have acquired basic knowledge of molecular level vectors used as genetic engineering tool for development of new plant variety
CO4	Understand the application of Applications of GMO/GMC in food, agriculture and industrial sector, Regulatory and Social aspects of Food Biotechnology
CO5	The student will gain basic knowledge of IPR (patent, design, copyright and Geographical indication). Significance of IPR and how to obtain patent or filing process of patent.

COURSE: HYGIENE AND FOOD SAFETY

COURSE CODE : BE-339

COURSE OBJECTIVES:

The objective of this course is to explain the common causes of foodborne illness; to outline fundamental microbiological concepts; to describe the characteristics of important foodborne pathogens and hazards; to detect and identify foodborne pathogens and be able to list the steps in the inspection process; to summarize the procedures to be used in the control of foodborne illness; to impart knowledge about sanitation and hygiene.

COURSE OUTCOMES: ***After completion of the course, a student will be able to achieve these outcomes***

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Introduce the concept of food hygiene, importance of safe food and laws governing it.
CO2	Learn common causes of food borne illness - viz. physical, chemical and biological and identification through food analysis.
CO3	Understand food inspection procedures employed in maintaining food quality.
CO4	Recognize the importance of wholesome, clean and labeled food in protecting public health.

B.TECH. FOOD TECHNOLOGY 6th SEMESTER

COURSE: MEAT, FISH, AND POULTRY TECHNOLOGY

COURSE CODE : BE-340

COURSE OBJECTIVES:

Through this course, students will learn the scientific principles involved in the processing of meat, fish, and poultry.

COURSE OUTCOMES: ***After completion of the course, a student will be able to achieve these outcomes***

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Understand the importance of meat, egg, and poultry industry.
CO2	Understand the compositional and technological aspects of meat, egg, and fish.
CO3	Understand the processing of fish.
CO4	Understand the processing of meat products

COURSE: BAKERY AND CONFECTIONERY TECHNOLOGY

COURSE CODE : BE-341

COURSE OBJECTIVES:

This course will help the students in understanding the status of bakery and confectionary industries in India. They will also learn about the technologies behind bakery and confectionary products and the innovations in this sector.

COURSE OUTCOMES: ***After completion of the course, a student will be able to achieve these outcomes***

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Impart knowledge on principles of baking.
CO2	Introduce baking techniques to produce bread, biscuits and cakes.
CO3	Familiarize with various packaging materials used in food industry.
CO4	Demonstrate the role of ingredients and processes in the production of bakery and confectionery products.

COURSE: FOOD PACKAGING TECHNOLOGY

COURSE CODE : BE-342

COURSE OBJECTIVES:

The main objective of this subject is to impart knowledge and skills related to designing packaging system in food products and developing skills in handling of packaging equipment in the students.

COURSE OUTCOMES: ***After completion of the course, a student will be able to achieve these outcomes***

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Understand the objectives and functions of packaging and the basic packaging requirements of a wide range of foods.
CO2	Know different types and characteristics of packaging materials viz paper and plastic.
CO3	Comprehend about metal packaging and different types of metal packages.
CO4	To understand the manufacturing process and properties of glass.
CO5	To understand the principle and applications of advanced food packaging techniques like active and intelligent packaging, vacuum packaging, ascetic packaging etc

COURSE: FOOD PLANT LAYOUTS

COURSE CODE : BE-343

COURSE OBJECTIVES:

To impart knowledge on plant layout and design of food industries. By the end of the course, the students will acquire knowledge on theoretical aspects to be considered for site selection, layout selection and design considerations for a food plant.

COURSE OUTCOMES: ***After completion of the course, a student will be able to achieve these outcomes***

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Provide a basis in selecting a location as well as plant layout with respect to material handling, space utilization, future expansion etc.
CO2	Understand fixed costs, variable costs, inputs and machinery involved in planning and functioning of an industry.
CO3	Understand the importance of availability of raw material and facilities for production of goods
CO4	Integrate man, materials and machinery for optimum production

COURSE: FRUIT AND VEGETABLE TECHNOLOGY

COURSE CODE : BE-344

COURSE OBJECTIVES:

To learn about the different techniques involved in the processing of fruits and vegetables.

COURSE OUTCOMES: ***After completion of the course, a student will be able to achieve these outcomes***

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Acquire knowledge on methods of processing and preservation of fruits and vegetables.
CO2	Understand the changes occurring in fruits and vegetables in relation to processing methods.
CO3	Demonstrate the manufacture, preservation and packaging of jam, jelly, marmalade, pickles and preserves.
CO4	Become familiar with freezing and dehydration of fruits and vegetables.

COURSE: MEAT, FISH, AND POULTRY TECHNOLOGY LAB

COURSE CODE : BE-345

COURSE OBJECTIVES:

To provide the basic knowledge about the various quality chracateristics evaluation of meat, fish, and poultry products

COURSE OUTCOMES: ***After completion of the course, a student will be able to achieve these outcomes***

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Able to perform the proximate analysis of meat and meat products
CO2	Able to perform the quality tests of egg.
CO3	Able to perform the microbial analysis of meat and meat products.
CO4	Able to prepare meat products.

COURSE: FRUIT AND VEGETABLE TECHNOLOGY LAB

COURSE CODE : BE-346

COURSE OBJECTIVES:

To perform experiments relevant to fruit and vegetable processing industries.

COURSE OUTCOMES: ***After completion of the course, a student will be able to achieve these outcomes***

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Understand the role of processing in terms of shelf life, safety, nutritional and economic value of fruit and vegetables.
CO2	Assess the role in pre- and post-harvest changes in fruits and vegetables on product quality.
CO3	Gain knowledge on production, preservation and packaging of jam, jelly, marmalade, pickles, candies

COURSE: FERMENTATION TECHNOLOGY

COURSE CODE : BE347

COURSE OBJECTIVES:

Introduce students to basic concepts of fermentation technology. Introduce students to local and foreign fermented foods and provide students with information about the importance or advantages of fermented foods.

COURSE OUTCOMES: ***After completion of the course, a student will be able to achieve these outcomes***

COURSE OUTCOME (CO)	DESCRIPTION
CO1	The students will learn about the basics fermentation and difference in primary and secondary metabolites.
CO2	The students will learn about the Design of fermenter, Aerobic and anaerobic fermentation and kinetics in in Batch, Fed batch and continuous mode of reaction.
CO3	The students will learn about the role of Mass transfer in fermenter and fermentation processes.
CO4	The students will learn about the Industrial microbes and their role in Alcoholic Beverages and Fermented Vegetables.
CO5	The students will learn about the cereal based fermented food like production of Baker's Yeast, Idli, Dosa, Dhokla, Soy sauce, Tofu, Tempeh, Natto etc.

COURSE: FOOD AND NUTRITION

COURSE CODE : BE-348

COURSE OBJECTIVES:

After completing this course, the students will be able to discuss human nutrition for healthy adults. Discuss the role of diet in causing and preventing various diseases, particularly chronic diseases. Describe methods used to assess nutrition status. Explain how dietary recommendations are formulated.

COURSE OUTCOMES: ***After completion of the course, a student will be able to achieve these outcomes***

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Understand the energy vales of importance food components carbohydrate, proteins, fat, minerals, vitamins and water in food
CO2	Understand the immunity, infection and nutrition.
CO3	Explain Understand the nutritional quality of diet and its requirements.

B.TECH. FOOD TECHNOLOGY 7th SEMESTER

COURSE: EDIBLE OIL PROCESSING TECHNOLOGY

COURSE CODE : BE-431

COURSE OBJECTIVES:

To acquaint the students with production, unit operation, and causes of spoilages of edible oils.

COURSE OUTCOMES: ***After completion of the course, a student will be able to achieve these outcomes***

COURSE OUTCOME (CO)	DESCRIPTION
CO1	To provide the knowledge of oil extraction from the various oil seeds.
CO2	To provide the basics of the critical parameters involved in the extraction, refining, bleaching, deodorization of fats and oils and their modifications (blending, interesterification, emulsification, votation, fractionation and genetic manipulation) into functional shortenings and the subsequent handling and the preservation of their quality.
CO3	To provide the basic chemistry of fats and oils with focus in the understanding of the relevance of their physicochemical and biochemical properties in their functions as ingredients in foods.
CO4	To provide knowledge and understanding of the changes and reactions of fats and oils in the food system influencing the stability of the finished food.

COURSE: FOOD REGULATION AND QUALITY CONTROL

COURSE CODE : BE-432

COURSE OBJECTIVES:

To provide the students an opportunity to learn food safety and management systems and to learn international food laws and quality standards.

COURSE OUTCOMES: ***After completion of the course, a student will be able to achieve these outcomes***

COURSE OUTCOME (CO)	DESCRIPTION
CO1	The students will get proper knowledge about the food hygiene, analysis, sampling techniques, storage and preservation.
CO2	The students will learn role of physicochemical properties of food and its analysis in food industries and food quality management systems.
CO3	The students will get proper knowledge about quality management systems to food production processes, food safety regulations and Food Standards Code and laws.
CO4	The students will learn about the quality assessment of food materials and its handling in industrial level and the role of sanitation in food industries.

COURSE: PLANTATION PRODUCTS AND SPICES TECHNOLOGY

COURSE CODE : BE-433

COURSE OBJECTIVE:

To acquaint the students with the methods for processing of various spices, tea, coffee, and cocoa.

COURSE OUTCOMES: ***After completion of the course, a student will be able to achieve these outcomes***

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Enhance their knowledge on processing methods and equipment's used in the manufacture of different tea types, manufacture of instant and decaffeinated teas, and physiological effects of tea drinking
CO2	Understand the technological objectives of grinding and roasting of coffee beans, manufacture of instant and decaffeinated coffee and Coffee substitutes, physiological effect of coffee consumption and Chemical changes during the processing of coffee.
CO3	Understand the concept of different unit operations employed in cocoa processing, chocolate manufacture
CO4	Understand the concept of spice processing, spice essential oils and spice oleoresins with respect to method of extraction, isolation, and encapsulation.

COURSE: EDIBLE OIL PROCESSING TECHNOLOGY LAB

COURSE CODE : BE–434

COURSE OBJECTIVES:

To provide the students basic knowledge about the quality evaluation of various fats.

COURSE OUTCOMES: ***After completion of the course, a student will be able to achieve these outcomes***

COURSE OUTCOME (CO)	DESCRIPTION
CO1	To be able to perform the quality control testing of edible oils.
CO2	To be able to identify the shelf life of oil.
CO3	To be able to understand the oil production and processing.

COURSE: NOVEL FOOD PROCESSING TECHNOLOGIES

COURSE CODE : BE-435

COURSE OBJECTIVES:

To acquaint the students with the scope of emerging food processing technologies and their limitations.

COURSE OUTCOMES: ***After completion of the course, a student will be able to achieve these outcomes***

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Know about application of High pressure processing and pulsed electric field processing
CO2	Know the importance of irradiation
CO3	Gain knowledge on thermal and non-thermal processing techniques

COURSE: ANALYTICAL TECHNIQUES

COURSE CODE : BE-436

COURSE OBJECTIVES:

To develop an understanding about the advanced analytical and instrumental techniques. To illustrate the principle and mechanism of analytical instruments. To learn the process of analysis from sampling to interpretation of results.

COURSE OUTCOMES (CO): ***After completion of the course, a student will be able achieve these outcomes***

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Apply statistically valid sampling techniques to food materials having widely diverse properties and volumes.
CO2	Demonstrate competency in the use of standard techniques of food analysis and the treatment of experimental data.
CO3	Apply modern instrumental methods to analyse chemical and physical properties of foods.
CO4	Compare the purposes and methods of food analysis employed in government, research and industry.

COURSE: NUTRACEUTICALS AND FUNCTIONAL FOODS

COURSE CODE : BE-438

COURSE OBJECTIVES:

To acquaint students with therapeutic properties of major fruits, vegetables, spices,and herbs.

COURSE OUTCOMES: ***After completion of the course, a student will be able to achieve these outcomes***

COURSE OUTCOME (CO)	DESCRIPTION
CO1	To understand the concept of nutraceutical science and its relation with other sciences.
CO2	Acquire knowledge on various bio molecules showing health benefits.
CO3	Understand various physiological and biochemical aspects of life threatening and chronic diseases and nutraceutical as their remedies.
CO4	Apply their knowledge regarding extraction, isolation, characterization and application of nutraceuticals in food industries.
CO5	To understand about various inhibitors present in food and their prevention, role of prebiotics and probiotics as nutraceuticals