

## **JIWAJI UNIVERSITY, GWALIOR**

### **Centre For Food Technology**

The Centre for Food Technology, Jiwaji University, Gwalior department establish in 2003 as teaching and research center. Over a period of time, it has acquired prestigious status at National level. Major area of research carried out in this department includes, Students will have knowledge on the fundamentals of food science, food chemistry and biochemical changes during processing and preservation, nutraceuticals, also students will be able to understand and apply sensory evaluation of food, product analysis, organoleptic properties of food, ,water management for food microbiology, ion exchange chromatography for therapeutic foods , There have been significant contributions in the frontier areas of food technology by way of research publications in journals of repute. Various funding agencies is providing financial assistance. To prepare academicians and trained industrial candidates and scientists for professional and top position in R & D and Teaching including Industrial sector, the department is running following programs:

#### **M.Sc. Food Technology**

##### **Programme Outcomes (POs)**

After successful completion of the program, Students will have knowledge on the fundamentals of food science, food chemistry and biochemical changes during processing and preservation, nutraceuticals, also students will be able to understand and apply sensory evaluation of food. Food technology is a branch of food science which majorly deals with the manufacturing, Students can pursue for M.sc in food technology. As a food scientist, their main activity is the improvement and development of new food products. As food losses during storage and processing can be enormous, food scientists are involved in adapting and developing preservation methods appropriate and affordable to various regions of the world. They must also find creative ways to meet the consumer demand. The aims of food industry today-

1. To extend the shelf life of food by preservation techniques
2. To increase variety in the diet by providing a range of attractive flavors, colors, aromas and texture in food
3. To provide the nutrients required for health
4. To work on healthy and herbal products

Thus food technology has a wide range of employment opportunities to students. It has a wide scope as food industry is one of the largest growing industries in the world.

### **Programme Specific Outcomes (PSOs)**

Food technology is a branch of food science which majorly deals with the manufacturing, processing, preserving, and packaging of food and its articles. Future scope for food technology. Universities and colleges around the globe are adopting this branch of food science into their curriculum. India is essentially an agricultural country and the economy is basically agrarian in nature. More than 70% of the population lives in rural areas and out of them 80% depend on agriculture for employment and livelihood. For an agrarian country economy, rural population can be considerably benefited by food technology at least in the following three ways:

Curriculum of Centre for food Technology is designed to prepare post graduates to attain the following program specific outcome roes:

**PSO1:** Instant foods, energy foods and baby foods can be produced from the locally available raw materials which will reduce child malnutrition.

**PSO2:** Integrated food management for storage, transportation and distribution.

**PSO3:** Application of food technology practices for processing traditional foods by way of drying, pickling, salting and smoking. Processing

**PSO4:** Manufacturing and processing of different type coffee, tea and cocoa powder or product description.

**PSO5:** Manufacturing and processing of meat and poultry products.

**PSO6:** Advance information of flavors and methods dairy manufacturing products.

**PSO7:** Display their true potential and get appropriate endorsement through qualifying NET/GATE/SLET/ State Civil Services and other competitive examination

## **Course Outcomes (COs)**

### **For M.Sc. Programme**

#### **FOOD CHEMISTRY**

Students after studying food Chemistry courses are expected:

**CO 1:** Students will understand the changes in food during cooking, processing, storing and even digestion for carbohydrates.

**CO 2:** Knowledge of the chemical components (nutritional value) of food is essential for developing a food product. This also informs the health importance of food chemistry.

**CO 3:** .To understands flavor changes in fats and oils, lipid oxidation & factors affecting lipid oxidation.

**CO 4:** To understands about methods and application Vitamins, Minerals and methods of Fortification.

**CO 5:** To understands Nature, function, nomenclature & structure, its classification and properties of enzymes and its activity in different food systems, factors affecting rate of enzymatic action.

#### **FOOD BIOCHEMISTRY AND NUTRITION**

Students after studying food biochemistry and nutrition courses are expected:

**CO 1:** To emphasize the need for greater and more efficient utilization of the existing food sources and development of entirely sources of different food groups and digestion of carbohydrates.

**CO 2:** Introduction of protein and Fat emphasize on digestion of fat and protein.

**CO 3:** To understands salient features, requirements, food sources, effects of excess and deficiency of Fat, Water soluble vitamins and Minerals.

**CO 4:** To understands the concept of balance diet, menu planning in different ages and diseases and recommendatory dietary allowance.

**CO5:** Introduction, principle, instrumentation & application of Colorimetry, Fluorimetry and Spectroscopy.

## **FOOD MICROBIOLOGY**

Students after studying Food Microbiology courses are expected:

**CO 1:** Students will be able to understand the principles behind microbiological techniques used in evaluating the quality of food. They will be able to identify the microorganism responsible for food spoilage and the methods to control the food spoilage

**CO 2:** To understands about Food Hygiene and Sanitation and Contamination during handling and processing and its control, indicator, indicator organisms; rapid methods in detection of microorganisms.

**CO 3:** Outlines of indicators of water and food safety and quality-Microbiological criteria of foods and their significance.

**CO 4:** :To understands the characteristic features, dynamics and significance of spoilage of different groups of foods - Cereal and cereal products, vegetables and fruits, meat, poultry and sea foods, milk and milk products, packed and canned foods.

**CO 5:** To understands types of fermentation, fermenter. Importance, Bacterial, yeast and mold cultures; single and mixed cultures, propagation, maintenance and evaluation of cultures; factors affecting activity of culture.

## **PRINCIPLES OF FOOD PROCESSING & PRESERVATION**

Students after studying PRINCIPLES OF FOOD PROCESSING & PRESERVATION courses are expected:

**CO 1:** Students shall develop the knowledge of need of food processing and learn various preservation techniques.

**CO 2:** To understands the Source of radiations, mode of action effect on microorganisms and different nutrients dose requirements for radiation preservation of food.

**CO 3:** To understands the method of freezing, freeze drying, storage, and thawing of frozen food.

**CO 4:** To understands about the application in food industry processes and equipment for manufacture of various concentrated foods and their keeping quality.

**CO 5:** To understands the processing and preservation by drying, various methods employed in production of dehydrated food products, selection of methods based on characteristics of foods to be produced, advantages and disadvantages of different methods.

## **FRUITS AND VEGETABLE TECHNOLOGY**

Students after studying fruits and vegetable Technology courses are expected:

**CO 1:** Students aims in providing knowledge about the fruit and vegetable structure, post-harvest physiology and its spoilage.

**CO 2:** The student shall understand biological, chemical and physical properties of fruits and vegetables and the technologies involved in the processing, preservation and value-addition of fruit and vegetable products.

**CO3:** To understand the post-harvest changes, handling and packaging of fruits and vegetables, chilling injury & disease, storage practices: CA and MA, hypobaric storage, pre-cooling and cold storage,

**CO 4:** Study about Preparation of various, canning pickles, sauces and chutneys, problems related to shelf life of pickles and chutneys, quality control.

**CO 5:** To understands Production and manufacturing of Tea, Coffee and Cocoa and Vinegar.

## **FOOD QUALITY CONTROL, LAWS AND MANAGEMENT**

Students after studying Food Quality control, laws and Managements courses are expected:

**CO 1:** This course aims to impart the knowledge of food safety issues, surveillance and monitoring techniques, Food Labeling as well as sanitation and food allergy. To know the principles of Food Safety and Quality.

**CO 2:** Students will understands Quality attributes, Quality measurement techniques, process design and control and product design and control, TQM, IPR and Patent.

**CO 3:** Students will understand about Food laws and regulations National and International.

**CO 4:** Understand the Concept of entrepreneur and entrepreneurship, quality, functions of an entrepreneur. Current status of entrepreneurship in Indian food industries.

**CO 5:** To understands the sensory evaluation, Selection of sensory panelists; Factors influencing sensory measurements.

## **FOOD ENGINEERING**

Students after studying Food Engineering courses are expected:

**CO 1:** The students shall be able to understand the basics of mass and energy conservation, fundamentals of fluid flow dynamics as applied to food processing operations.

**CO 2:** To understands modes of heat transfer and overall heat transfer; thermal properties of foods such as specific heat and thermal conductivity.

**CO 3:** To understands mechanism of drying, moisture, food dehydration and Evaporation.

**CO 4:** Students will understand Chilling, refrigeration & freezing, types of freezers, precooling.

**CO 5:** To student separation processes Centrifugation, Chromatographic Techniques and Membrane filtration technology.

### **FOOD PACKAGING**

Students after studying Food Packaging courses are expected:

**CO 1:** The students shall gain knowledge on the different types of materials and media used for packaging foods, hazards associated with packaging materials, laws, regulation and the monitoring agencies involved in food safety.

**CO 2:** To understands Packaging terminology- definition, types of packaging. Functions of food packaging, characteristics of food stuff that influences packaging selection.

**CO 3:** Students will understands Packaging material and their properties with function.

**CO 4:** Students will understand packaging of fresh and processed foods.

**CO 5:** To understands Packaging Laws, Regulations, Evaluation and Quality control.

### **PROCESSING OF CEREALS, LEGUMES, OILSEED AND SUGAR CROPS**

To create knowledge about the processing and quality evaluation.

**CO 1:** Student will acquire the understanding of the technologies used for processing of cereal grains. Understands structure of wheat, Rice and Corn, Oats, Barley.

**CO 2:** To understand Rice Classification, structure & composition, physicochemical characteristics; cooking quality; rice milling technology.

**CO 3:** Students will corn types and nutritive value; dry and wet milling, processing of corn in breakfast cereals.

**CO 4:** To understands Legumes and oilseeds: composition, anti-nutritional factors, processing and storage; processing.

**CO 5:** To understands manufacturing and processing of sugar crops and tubers.

## **Dairy Technology**

To create knowledge about the processing and quality evaluation of cereal grains.

**CO 1:** Students shall acquire knowledge about composition, processing, product development, organization and operations involved in milk processing unit.

**CO 2:** To understands the Composition and characteristic of milk and different methods treatments Collection, chilling and transportation.

**CO 3:** To understands principles and practices of manufacture, packaging, storage and marketing etc.

**CO 4:** To understands technology of frozen milk products and indigenous milk products.

**CO 5:** To understands the cheese manufacture of hard, semi hard, soft and processed cheeses, Storage, grading and marketing of cheese.

## **Meat, Fish and Poultry Products**

To create knowledge about the meat, fish and poultry products.

**CO 1:** Students shall be well versed of all aspects of fish industry, processing, preservation and pre and post slaughtering process for all products.

**CO 2:** To understands about Meat slaughtering methods, components of carcass viz., Muscle, postmortem glycolysis.

**CO 3:** To understand of poultry Pre slaughter care, Ante Mortem examination Slaughter. Dressing and Post mortem Composition of chicken Muscle.

**CO 4:** To understands to structure Composition and Nutritive Value of Value of Egg. Egg. Proteins and Functional Properties of egg.

**CO 5:** To understands Finished Product Quality, Appearance, Color Texture. Viscosity. Consistency. Flavor Defects. Bacterial Contamination and Foreign Matter.

## **Fermentation Technology**

To create knowledge about the fermentation technology products evaluation.

**CO 1:** To understands for Fermentation, types of fermentation, pathways of metabolic reactions for utilization of carbon sources and formation of different metabolites by microorganisms.

**CO 2:** To understands to typical media, Media formulation: - Carbon Source, Nitrogen source, Minerals, Growth Factors,

**CO 3:** To understand Fermenter design, Instrumentation and control, Types of fermenters.

**CO 4:** To understand about Downstream Processing: Various equipment for product recovery; micro-filters.

**CO 5:** To understand Fermentative Production Foods Processes for preparing fermented products including Yogurt (curd) and other.

### **PRODUCT DEVELOPMENT FROM FOOD INDUSTRY REFUSE**

To create knowledge about the products development from food industry refuse products.

**CO 1:** To understand about production of pectin, ethanol, natural gas, citric acid, activated charcoal, fiber extract from apple pomace, vitamins.

**CO 2:** To understand about production of fish meal; Fish protein concentrate; Animal feed; Shell product.

**CO 3:** To understand to Feed for livestock from wheat and corn bran and germ.

**CO 4:** To understand about Fermentation products from whey. Condensed & dried products from whey.

**CO 5:** To understand about utilization of tea, coffee and cocoa waste as feed for livestock & poultry.

### **Food Additives, Spice and Flavor Technology**

To create knowledge about the food additives, spice and flavor Technology products evaluation.

**CO 1:** To understand of additives in food processing and preservation. their functions, types and safety

**CO 2:** To understand of Food Flavor basics Olfactory perception of flavor and taste, relationship of taste.

**CO3:** To understand about Flavor production during processing-enzymatic development, effect of roasting & frying on flavor developments, staling of flavors

**CO 4:** To understand about Major spices and Minor spices–Oleoresins and essential oils; method of manufacture.

**CO 5:** To understand about Food Additives and toxicants added or formed during Food Processing.

### **FOOD BIOTECHNOLOGY**

To create knowledge about the food biotechnology products evaluation.

**CO1:** They will understand the Prospectus of biotechnology with definition, scope and applications in Food.

**CO 2:** To understand the traditional applications of food biotechnology and fermented foods.

**CO 3:** To understand Starter cultures – types, designing and development, micro encapsulation and packaging, scopes

**CO 4:** To understands about Genetically modified food concept, types and application and ethical issues concerning GM foods.

**CO 5:** To understands Enzyme technology, Production of enzymes and uses.

### **Biostatistics, computer applications**

To create knowledge about the biostatistics, computer application products evaluation.

**CO1:** To understands about computer applications and use of computers for preparing and presenting documents.

**CO 2:** To understands about population and sample and types of statistical data, collection and classification of data.

**CO 3:** To understands about elementary probability theory and addition and multiplication.

**CO 4:** To understands about basic concept of hypothesis testing and Type I and type II errors. Tests based on Means.

**CO 5:** To understands about framing Proposal for acquiring grants.

### **Advances in Food Technology**

To create knowledge about the Advances in Food Technology application products evaluation.

**CO1:** Students will understand Historical development and eras of modern food processing with application of extrusion cooking in food.

**CO 2:** To understands about advances in Non-thermal processing of foods.

**CO 3:** They understands advances in fortification in complementation & supplementation.

**CO 4:** To understands about encapsulation design and structure of microcapsules and advantages and applications of encapsulation.

**CO 5:** To understands about fractionation of fat and application and food processing

### **NUTRACEUTICALS AND FUNCTIONAL FOODS**

To create knowledge about the Nutraceuticals and Functional Food application products

**CO1:** To understands about Nutraceuticals and functional Foods with definition, concept, history and market.

**CO 2:** To understands about Natural occurrence of certain phytochemicals with Antioxidants and flavonoids.

**CO 3:** To understands about probiotics and symbiotics probiotics with Definition, types and relevance.

**CO 4:** To understands about prebiotics with definition, chemistry, sources, metabolism, effect of processing.

**CO 5:** To understands Functional foods with definition, development of functional foods, use.

## **Entrepreneurship and Business Management in Food Technology**

To create knowledge about the Entrepreneurship and Business Managements in Food Technology

- CO 1:** To understands about Entrepreneurship and Management in food processing industry.
- CO 2:** To understands about Forms of Business Organisations type and concepts.
- CO 3:** To understands about Objectives of Production Management, Qualities and Responsibilities.
- CO 4:** To gain knowledge about Financial and Marketing Management with concepts.
- CO 5:** To understand about Personnel Management Quality and Materials Management.