

# Department of Food Technology

## Program Outcomes (POs)

1. **Engineering Knowledge:** Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
2. **Problem Analysis:** Identify, formulate, research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
3. **Design/ Development of Solutions:** Design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal and environmental considerations.
4. **Conduct investigations of complex problems** using research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions.
5. **Modern Tool Usage:** Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The Engineer and Society:** Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice.
7. **Environment and Sustainability:** Understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.
9. **Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse teams and in multi disciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations and give and receive clear instructions.
11. **Project Management and Finance:** Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long Learning:** Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

## Program specific outcomes (PSOs)

1. Graduates will be able to apply the knowledge of mathematics, science and basic

- engineering and computing in the field of food technology.
2. Graduates will be able to use modern techniques, skills and engineering tools necessary in food technology in global and social context.
  3. Graduates will be able to communicate effectively to function in multidisciplinary team.

## **Course Outcomes (COs)**

### **3<sup>rd</sup> Sem**

**Course Name: Environmental Engineering**

**Course Code: CH(FT) 301**

#### **Course Outcome:**

**CO1:** Able to understand the natural environment and its relationships with human activities

**CO2:** Able to apply the fundamental knowledge of science and engineering to assess environmental and health risk

**CO3:** Able to understand environmental laws and regulations to develop guidelines and procedures for health and safety issues.

**CO4:** Able to acquire skills for scientific problem-solving related to air, water, & land pollution.

**Course Name: Chemistry-2 Course**

**Code: CH(FT) 302 Contact : 2:1:0**

#### **Course Outcome:**

**CO1:** Able to understand fundamental concepts of Dilute solutions, Colligative properties and Ionic Equilibrium in different engineering applications.

**CO2:** Able to analyze the Structures of the molecules by the different spectral techniques. **CO3:** Able to synthesize Colloid Systems and emulsions.

**CO4:** Able to apply the basic concept of Organic Chemistry and knowledge of Chemical reactions to industries, and technical fields.

**CO5:** Able to analyze different types of co-ordination compounds and their structures with the help of Crystal Field Theory.

**Course name: Thermodynamics & Kinetics**

**Course Code: FT 301**

**Course Outcome:**

**CO1:** Ability to understand the terminology associated with engineering thermodynamics and have knowledge of contemporary issues related to chemical engineering thermodynamics

**CO2:** Ability to have the knowledge of phase equilibria in two-component and multi component systems

**CO3:** Ability to estimate thermodynamic properties of substances in gas or liquid state of ideal and real mixture

**CO4:** Ability to anticipate intermolecular potential and excess property behaviour of multi component systems

**CO5:** Ability to review concepts of order and molecularity of chemical reactions.

**Course Name: Food Microbiology**

**Course Code: FT 302**

**Course Outcome:**

**CO1:** Ability to classify different types of microorganism which are present in the environment.

**CO2:** Ability to describe the internal and external factors and predict microorganisms, which can cause food spoilage.

**CO3:** Ability to interpret the causes of food borne diseases and their etiology. **CO4:** Ability to evaluate the measures required to control undesired microorganisms in food.

**CO5:** Ability to collect knowledge about disinfection and disinfectants.

**Course Name: Chemistry of Food**

**Course Code: FT 303**

**Course Outcome:**

**CO1:** Ability to understand the structure and composition of different nutrients. **CO2:**

Ability to demonstrate the physical and chemical properties of different nutrients.

**CO3:** Ability to recognize the function of the nutrients in different food materials and understand their practical implications.

**CO4:** Ability to analyze how processing conditions are likely to change the reactivity of food components.

**CO5:** Ability to apply fundamental concepts to know the principles behind analytical techniques associated with food.

**Course Name: Environmental Engineering Lab**

**Course Code: CH (FT) 391**

**Course Outcome:**

**CO1:** Able to operate different types of instruments for estimation of small quantities chemicals used in industries and scientific and technical fields.

**CO2:** Able to apply the fundamental knowledge of science and engineering to assess environmental and health risk.

**CO3:** Able to work as an individual also as a team member.

**CO4:** Able to analyses different parameters of water considering environmental issues.

**CO5:** Able to analyze the different parameters of soil considering environmental issues.

**Course Name: Chemistry-2 Lab**

**Course Code: CH (FT) 392 Contact: 0:0:3**

**Course Outcome:**

**CO1:** Able to operate different types of instruments for estimation of small quantities chemicals used in industries and scientific and technical fields.

**CO2:** Able to apply the fundamental knowledge of science and engineering to assess the kinetics of the reactions.

**CO3:** Able to work as an individual also as a team member.

**CO4:** Able to analyze different types of organic and inorganic salts.

**CO5:** Capable to design innovative experiments applying the fundamentals of chemistry such as Nanomaterials, soap etc.

**Course Name: Chemistry of Food Lab I**

**Course Code: FT 391**

**Course outcome:**

After the completion of the Chemistry of Food Lab-I the students will be able to:

**CO1:** Define chemistry as the study of the composition, structure, properties of food materials and identify methods and instruments that can be used to study of food chemistry.

**CO2:** Recognize the importance of proximate analysis.

**CO3:** Develop skills to control the quality of food and to prevent adulteration.

**CO4:** Prioritize different controlling parameters to improve shelf-life of food.

**CO5:** Evaluate data generated by experimental methods for chemical characterization of food materials.

**Course Name: Food Microbiology Lab**

**Course Code: FT 392**

**Course outcome:**

After the completion of the Food Microbiology Lab the students will be able to:

**CO1:** Explain various methods of isolation, characterization and screening of bacteria, fungi and other related organisms

**CO2:** Develop skills to monitor various food processing operations in food industries.

**CO3:** Apply different preservation techniques relative to food safety and spoilage.

**CO4:** Illustrate the growth requirements of common food borne pathogens and spoilage microorganisms.

**CO5:** Identify which organisms would be likely to grow in a specific food product.

**Course Name: Behavioural & Interpersonal Skills**

**Course Code: MC-381**

**Course Outcome:**

**CO1:** It will equip the student to handle workplace interpersonal communication in an effective manner.

**CO2:** To enable students with strong oral and written interpersonal communication skills.

**CO3:** To prepare students to critically analyze workplace situations and take appropriate decisions.

**CO4:** To make students campus ready through proper behavioral and interpersonal grooming.

**CO5:** Integration of enhanced skill set to design and frame team based Project Report and Presentation.

## 4<sup>th</sup> sem

**Course Name: Numerical Methods**

**Course Code: M (FT) 401**

**Course Outcome:**

On successful completion of the learning sessions of the course, the learner will be able to:

**CO1:** Recall the distinctive characteristics of various numerical techniques and the associated error measures

**CO2:** Understand the theoretical workings of various numerical techniques to solve the engineering problems and demonstrate error

**CO3:** Apply the principles of various numerical techniques to solve various problems

**Course Name: Biochemistry & Nutrition**

**Course Code: FT 401**

**Course Outcome:**

**CO1:** Ability to describe the major metabolic pathways involved in the metabolism of nutrients in the human body.

**CO2:** Ability to understand the principles of biochemical methods and be able to use them with appropriate instruction.

**CO3:** Ability to interpret the basis of reactivity of biologically relevant molecules and their interactions.

**CO4:** Ability to analyze and evaluate experimental data.

**CO5:** Ability to explain the synthesis of proteins, lipids, nucleic acids, and carbohydrates and their role in metabolic pathways along with their regulation at the epigenetic, transcriptional, translational, and post-translational levels including RNA and protein folding, modification, and degradation.

**Course Name: Chemical Stoichiometry**

**Course Code: CH401**

**Course Outcome(s):**

**CO1:** Ability to illustrate the stoichiometric importance of an engineering process.

**CO2:** Ability to analyze with different systems of units and have the skill to convert units from one system to another.

**CO3:** Ability to read and apply graphical methods for representation of engineering data.

**CO 4:** Ability to calculate mass and energy balance equations to engineering problems and optimize the process requirements.

**CO 5:** Ability to predict how processing conditions are likely to change with respect to enthalpy requirements of a process.

**Paper Name: Principles of Food Preservation**

**Paper Code: FT402**

**Course Outcome(s):**

**CO1:** Ability to describe actions taken to maintain foods with the desired properties or nature for as long as needed.

**CO2:** Ability to identify quality-loss mechanisms as biological, chemical, and Physical. **CO3:** Ability to develop food handling practices that reduce the potential for food-borne illness.

**CO4:** Ability to apply preservation methods that make use of heat/cold, drying, acid, added chemicals, controlled air, pressure, and high-energy radiation.

**CO5:** Ability to use indirect approaches to food preservation – packaging, food hygiene, sanitation, Gas packaging.



**Paper Name: Values and Ethics in Profession**

**Paper Code: HU 401**

**Course Outcome:**

On Completion of this course student will be able to:

**CO1:** Understand the core values that shape the ethical behavior of an engineer and Exposed awareness on professional ethics and human values.

**CO2:** Understand the basic perception of profession, professional ethics, various moral issues & uses of ethical theories.

**CO3:** Understand various social issues, industrial standards, code of ethics and role of professional ethics in engineering field.

**CO4:** Aware of responsibilities of an engineer for safety and risk benefit analysis, professional rights and responsibilities of an engineer.

**CO5:** Acquire knowledge about various roles of engineers in variety of global issues and able to apply ethical principles to resolve situations that arise in their professional lives

**Course Name: Unit Operation of Chemical Engineering I**

**Course Code: FT 403A**

**Course Outcome(s):**

**CO1:** Ability to list chemical processes, units, and the corresponding equipment.

**CO2:** Ability to understand the basic principles of fluid mechanics

**CO3:** Capability to analyze pipe flows as well as fluid machinery

**CO4:** Ability to solve conduction, convection and radiation problems

**CO5:** Ability to design the performance of heat exchangers, crushers and grinders.

**Course Name: Transport Phenomena**

**Course Code: FT 403B**

**Course Outcome(s):**

**CO1:** Ability to understand the chemical and physical transport processes and their mechanism

**CO2:** Ability to do heat, mass and momentum transfer analysis

**CO3:** Ability to analyze industrial problems along with appropriate approximations and boundary conditions

**CO4:** Ability to develop steady and time dependent solutions along with their limitations

**Course Name: Biochemistry Lab**

**Course Code: FT491**

**Course outcome(s):**

After the completion of Biochemistry Lab students will be able to:

**CO1:** Learn various methods of sugars and amino acids separation.

**CO2:** Develop skills to monitor various enzymatic reactions.

**CO3:** Learn association of food protein structure with solubility, viscosity, gelation, texturization, emulsification and foaming.

**CO4:** Point out the threat of possible danger to health, or the very existence of certain species, it is essential to determine the quality of a water source before water is drawn off for consumption.

**CO5:** Gain knowledge of separation of immiscible liquids and solids from liquids.

**Course name: Chemistry of Food Lab II**

**Course Code: FT492**

**Course outcome:**

After the completion of the Chemistry of Food Lab II the students will be able to: **CO1:**

Develop the concept of estimation of minerals, pigments, crude fibre and antioxidants.

**CO2:** Learn various methods to determination different minerals and antioxidant content of food materials.

**CO3:** Measure different food compositions by spectrophotometric analysis.

**CO4:** Evaluate data generated by experimental methods for chemical characterization of food materials.

**CO5:** Analyze how the pigments of the food materials change in different conditions.

**Course Name: Unit Operation Lab I**

**Course Code: FT 493A**

**Course outcome(s):**

After the completion of the laboratory course students will be able to:

**CO1:** Define process equipment via hands-on learning.

**CO 2:** Analyze the experiments on flow regime and different flow meter

**CO 3:** Measure the Overall heat transfer coefficient of heat exchangers

**CO 4:** Determine the pressure drop for flow through packed bed.

**CO 5:** Examine the working characteristics of a crusher & grinder.

**Course Name: Transport Phenomena Lab**

**Course Code: FT 493B**

**Course Outcome:**

**CO1:** Ability to plan experiments and present the experimental data meaningfully **CO2:** Ability

to apply theoretical concepts for data analysis and interpretation

**CO3:** Capability to visualize and understand chemical engineering unit operations related to fluid and particle mechanics, and mass transfer

**CO4:** Understand the experimental techniques related to chemical reaction engineering

**Course Name: ENVIRONMENTAL SCIENCE**

**Course Code: MC 401**

**Course Outcome(s):**

**CO 1:** To understand the natural environment and its relationships with human activities.

**CO 2:** To apply the fundamental knowledge of science and engineering to assess environmental and health risk.

**CO 3:** To develop guidelines and procedures for health and safety issues obeying the environmental laws and regulations.

**CO 4:** Acquire skills for scientific problem-solving related to air, water, noise & land pollution.

**5<sup>th</sup> sem**

**Course Name: ECONOMICS FOR ENGINEERS**

**Course Code: HU 502**

**Course outcome:**

On completion of the course students will be able to

**CO1:** To Identify various uses for scarce resources

**CO2:** To understand key economic concepts and implement in real world problems

**CO3:** To apply critical thinking skills to analyze financial data and their impacts

**CO4:** To evaluate business performance through the knowledge of cost accounting principles

**Course Name: FOOD PROCESS TECHNOLOGY – I (Cereals, Fruits, Vegetables, Beverages)**

**Course Code: FT501**

**Course outcome(s):**

**CO1:** Ability to understand the Processing and storage of cereals.

**CO2:** Ability to gain the knowledge of processing methods of some cereal product and potato product.

**CO3:** Ability to apply the principles underpinning the safe and effective production of fruits and vegetables products and beverages.

**CO4:** Ability to implement their idea about detailed manufacturing technologies of nonalcoholic beverages consumed in daily life in food industries and collects some idea about some food additives.

**Course name: FOOD PROCESS TECHNOLOGY – II (fish, meat, poultry)**

**Course Code: FT502**

**Course outcome(s):**

**CO1:** Ability to identify the significance of fish processing and classify different processing techniques required for preservation of fish.

**CO2:** Ability to classify the different by products related to fish processing industries and describe their use.

**CO3:** Ability to differentiate various components of the meat muscle with special focus on slaughtering and post mortem changes in meat, preservation and to recognize the different processing techniques related to meat processing industry and use of meat byproducts

**CO4:** Ability to develop a general understanding on the structure, composition and nutritional values of eggs and recognize the effective preservation methods.

**Course name: FOOD PROCESS ENGINEERING**

**Course Code: FT503**

**Course outcome(s):**

**CO1:** Ability to explain the food processing techniques of thermal processing, eg, sterilization, evaporation, dehydration, separation, extraction.

**CO2:** Ability to build the knowledge of different freezers..

**CO3:** Ability to know the theory of different dryers.

**CO4:** Ability to collect basic idea of different types of heat exchangers and extruders.

**Course Name: Unit Operations of Chemical Engineering–II**

**Course Code: FT 504 A**

**Course Outcome:**

**CO1:** Ability to analyze diffusion and absorption operations

**CO2:** Ability to design distillation operation

**CO3:** Ability to solve the problems of extraction

**CO4:** Ability to apply the knowledge of drying and crystallization

**Course Name: Separation Process**

**Course Code: FT 504 B**

**Course Outcome:**

**CO1:** Ability to apply the knowledge of various chemical engineering separation processes.

**CO2:** Ability to Select appropriate separation technique for intended problem

**CO3:** Ability to analyze the separation system for multi-component mixtures

**CO4:** Ability to design separation system for the effective solution of intended problem

**Course Name: Food Processing Lab I**

**Course Code: FT591**

**Course outcome:**

**CO1:** Ability to use laboratory techniques common to basic Food Processing.

**CO2:** Ability to apply the principles that make a food product safe for consumption.

**CO3:** Ability to interpret government regulations pertaining to food manufacturing.

**CO4:** Ability to evaluate the effective test methods used in sensory evaluation and analyze the resulting information.

**Course Name: Food Analysis and Quality Control Lab**

**Course code: FT 592**

**Course outcome(s):**

**CO1:** Ability to analyze different components present in various food materials.

**CO2:** Ability to understand the various tests to detect adulterant in various food samples.

**CO3:** Ability to measure the parameters of different processed and non-processed foods.

**CO4:** Ability to develop processes to determine the storage stability of food materials.

**Course Name: Unit Operation Lab II**

**Course Code: FT 593 A**

**Course outcome:**

**CO1:** Define process equipment via hands-on learning.

**CO2:** Determine the filter medium resistance & cake resistance

**CO3:** Estimate separation coefficient in centrifugation and vacuum evaporation

**CO4** Compare drying rates of food using different types of driers

**Course Name: Separation Process Lab**

**Course Code: FT 593 B**

**Course outcome:**

**CO1:** Ability to understand, explain and select instrumental techniques for analysis

**CO2:** Ability to plan experiments and operate several specific instruments

**CO3:** Ability to analyze and interpret the experimental data

**Course Name: SOCIAL AWARENESS**

**Course Code: MC 581**

**Course outcome:**

**CO1:** Ability to understand the knowledge and methodologies to better understand the public issues and to act effectively as a citizen.

**CO2:** Ability to employ the knowledge and methodologies to enhance the functional components in their profession.

**CO 3:** Ability to employ the knowledge and methodologies to enhance their interpersonal interactions.

**CO 4:** Ability to prepare project report and give presentation on the social issues.

**6<sup>th</sup> sem**

**Course Name: FOOD PROCESS TECHNOLOGY – III (Milk and Milk products)**

**Course Code: FT 601**

**Course outcome(s):**

**CO1:** Ability to define milk, its composition and its varieties, apply different testing methods to detect adulterant in milk.

**CO2:** Ability to demonstrate thermal processing of milk and milk products and discuss cleaning and sanitization of different milk industry.

**CO3:** Ability to solve simple problem based on milk drying and to categorize different dried milk products.

**CO4:** Ability to formulate different milk based products and to prepare different traditional Indian dairy products.



**Course Name: FOOD PROCESS TECHNOLOGY – IV (Edible Fats and Oils)**

**Course Code: FT 602**

**Course Outcome(s):**

**CO1:** Ability to understand the various properties of fats and oils in processing, non-processing and storage condition.

**CO2:** Ability to know the different production and refining processes of vegetable oil.

**CO3:** Ability to explain different technology for manufacture of designer fats.

**CO4:** Ability to develop newer methods for analysis of non-oil constituents of oil bearing materials.

**Course Name: BAKERY, CONFECTIONARY AND EXTRUDED FOODS**

**Course Code: FT 603**

**Course outcome(s):**

**CO1:** Ability to gain knowledge on the ingredients, process and machinery involved in bakery and Confectionery technology and extruded products.

**CO2:** Ability to evaluate the function, properties and interaction of raw materials by manufacturing a range of products and to use a selected range of testing procedures to assess the performance of raw materials in the product.

**CO3:** Ability to demonstrate a detailed knowledge of the law relating to the composition, labelling and advertising of food and food products within this area sold for human consumption and to analyze production faults and suggest corrective actions and to assess product quality for industry and consumer requirements.

**CO4:** Ability to illustrate the technical knowledge for the development of Bakery and Confectionary industry and Extruded products

**Course Name: MICROBIAL TECHNOLOGY & FOOD BIOTECHNOLOGY**

**Course Code: FT 604 A**

**Course outcome(s):**

**CO1:** Ability to use the idea of biotechnology and microbiological quality of water and food.

**CO2:** Ability to know about production method of organic acids, alcoholic beverages and glycerol.

**CO3:** Ability to apply fermentation method to produce different food and medicines.

**CO4:** Ability to collect basic knowledge on genetic engineering and genetically modified crop.

**Course Name: ENVIRONMENTAL BIOTECHNOLOGY**

**Course Code: FT 604B**

**Course outcome(s):**

**CO1:** Ability to use the idea of quality of water and air.

**CO2:** Ability to know about management methods of wastes.

**CO3:** Ability to get idea about marine pollution.

**CO4:** Ability to collect basic knowledge on genetic engineering and genetically modified crop.

**Course Name: DATA STRUCTURE AND ALGORITHM**

**Course Code: FT605A**

**Course Outcomes:**

**CO1:** To differentiate how the choices of data structure & algorithm methods impact the performance of program.

**CO2:** To solve problems based upon different data structure & also write programs.

**CO3:** To identify appropriate data structure & algorithmic methods in solving problem.

**CO4:** To discuss the computational efficiency of the principal algorithms for sorting, searching, and hashing

**CO5:** To compare and contrast the benefits of dynamic and static data structures implementations.

**Course Name: DATABASE MANAGEMENT SYSTEM**

**Course Code: FT605B**

**Course Outcomes (COs):**

On completion of the course students will be able to

**CO1:** Apply the knowledge of Entity Relationship (E-R) diagram for an application.

**CO2:** Create a normalized relational database model

**CO3:** Analyze real world queries to generate reports from it.

**CO4:** Determine whether the transaction satisfies the ACID properties.

**CO5:** Create and maintain the database of an organization.

**Course Name: SOFTWARE ENGINEERING**

**Course Code: FT605C**

**Course Outcomes:**

CO1: To identify, formulate, and solve software engineering problems, including the specification, design, implementation, and testing of software systems that meet specification, performance, maintenance and quality requirements

CO2: To analyze, elicit and specify software requirements through a productive working relationship with various stakeholders of the project

CO3: To design applicable solutions in one or more application domains using software engineering approaches that integrates ethical, social, legal and economic concerns.

CO4: To develop the code from the design and effectively apply relevant standards and perform testing, and quality management and practice.

CO5: To identify modern engineering tools necessary for software project management, time management and software reuse, and an ability to engage in life-long learning.

**Course Name: FOOD PROCESSING LAB II**

**Course Code: FT691**

**Course outcome(s):**

**CO1:** Ability to use laboratory techniques common to basic Food Processing.

**CO2:** Ability to apply the principles that make a food product safe for consumption.

**CO3:** Ability to interpret government regulations pertaining to food manufacturing.

**CO4:** Ability to evaluate the effective test methods used in sensory evaluation and analyze the resulting information.

**Course Name: MICROBIAL TECHNOLOGY LAB**

**Course Code: FT692 A**

**Course outcome(s):**

**CO1:** Ability to understand and apply biotechnological processing/engineering principles to variety of fermented products.

**CO2:** Ability to develop new fermented products.

**CO3:** Ability to interpret and report data in scientific format.

**CO4:** Ability to understand new development in this field with analytical thinking of the various aspects of the new technology.

**Course Name: ENVIRONMENTAL BIOTECHNOLOGY LAB**

**Course Code: FT692 B**

**Course outcome(s):**

**CO1.** Ability to understand and apply biochemical processes..

**CO2.** Ability to determine the quality of water and food..

**CO3.** Ability to interpret and report data in scientific format.

**CO4.** Ability to understand new development in this field with analytical thinking of the various aspects of the new technology.

**Course Code: DATA STRUCTURES AND ALGORITHM LAB**

**Course Code: FT693A**

**Course Outcomes:**

**CO1:** Choose appropriate data structure as applied to specified problem definition.

**CO2:** Handle operations like searching, insertion, deletion, traversing mechanism on various data structures.

**CO3:** Have practical knowledge on the applications of data structures.

**CO4:** Able to store, manipulate and arrange data in an efficient manner.

**CO5:** Able to implement queue and stack using arrays and linked list. Implementation of queue, binary tree and binary search tree.

**Course Name: DATABASE MANAGEMENT SYSTEM LAB**

**Course Code: FT 693B**

**Course Outcome(s):**

On completion of the course students will be able to

**CO1:** Understand the basic concepts regarding database, know about query processing and techniques involved in query optimization and understand the concepts of database transaction and related database facilities including concurrency control, backup and recovery.

**CO2:** Understand the introductory concepts of some advanced topics in data management like distributed databases, data warehousing, deductive databases and be aware of some advanced databases like partial multimedia and mobile databases.

**CO3:** Differentiate between DBMS and advanced DBMS and use of advanced database concepts and become proficient in creating database queries.

**CO4:** Analyze database system concepts and apply normalization to the database.

**CO5:** Apply and create different transaction processing and concurrency control applications.

**Course Name: SOFTWARE ENGINEERING LAB**

**Course Code: FT 693C**

**Course Outcomes:**

**CO1:** To handle software development models through rational method.

**CO2:** To prepare SRS document, design document, test cases and software configuration management and risk management related document.

**CO3:** To develop function oriented and object oriented software design using tools like rational rose.

**CO4:** To perform unit testing and integration testing

**CO5:** To apply various white box and black box testing techniques

**Course Name: CONSTITUTION OF INDIA**

**Course Code: MC601**

**Course Outcome:**

Student will be able to:

**CO1:** Develop human values; create awareness about law ratification and significance of Constitution

**CO2:** Comprehend the Fundamental Rights and Fundamental Duties of the Indian Citizen to implant morality, social values and their social responsibilities.

**CO3:** Create understanding of their Surroundings, Society, Social problems and their suitable solutions.

**CO4:** Familiarize with distribution of powers and functions of Local Self Government.

**CO5:** Realize the National Emergency, Financial Emergency and their impact on Economy of the country.

## 7<sup>th</sup> sem

**Course Name: Principles of Management**

**Course Code: HU 704**

**Course outcome:**

On completion of the course students will be able to

**CO1:** To recall and identify the relevance of management concepts.

**CO2:** To apply management techniques for meeting current and future management challenges faced by the organization

**CO3:** To compare the management theories and models critically to solve real life problems in an organisation.

**CO4:** To apply principles of management in order to execute the role as a manager in an organisation.

**Course Name: Waste Management of Food Industries**

**Course Code: FT 701**

**Course outcome(s):**

**CO1:** Ability to classify different industrial waste, nature of the waste and its characteristics.

**CO2:** Ability to identify different treatment methods for liquid/solid waste and the recovery of useful material from waste as by products

**CO3:** Ability to interpret data regarding different waste treatment method.

**CO4:** Ability to apply different methods in industry and domestic purpose.

**Course Name: Enzyme Technology**

**Course Code: FT 702A**

**Course outcome(s):**

**CO1:** Ability to explain the enzyme kinetics and the effects of different parameters on enzymes.

**CO2:** Ability to understand the production and purification processes of enzyme.

**CO3:** Ability to have the knowledge on applications of enzyme in biochemical and food processing industries.

**CO4:** Ability to apply the concepts of recombinant DNA Technology and immobilized enzymes in biochemical engineering.

**Course Name: Renewable Energy Technology**

**Course Code: FT 702B**

**Course outcome(s):**

**CO1:** Ability to define the different biological fuels and biomass as a source of renewable energy

**CO2:** Ability to explain the phenomenon of thermal combustion of biomass and biogas generation.

**CO3:** Ability to describe the process of hydrogen production by photosynthetic bacteria.

**CO4:** Ability to classify the different technologies behind the conversion of biomass to clean fuels and petrochemical substitutes.

**Course Name: Plant Maintenance, Safety & Hygiene**

**Course Code: FT 702C**

**Course outcome(s):**

**CO1:** Ability to describe safety levels in different food industries.

**CO2:** Ability to understand different industrial parameters that affect the environment in food processing units.

**CO3:** Ability to apply the HACCP protocols in food industries.

**CO4:** Ability to create an overall safe environment for food processing industries and safety from



adulterated food.

**Course Name: Food Packaging Technology**

**Course Code: FT 703A**

**Course outcome(s):**

**CO1:** Ability to define food packaging and explain its function.

**CO2:** Ability to differentiate between different packaging materials like metals, glass, plastics and papers and their methods of production.

**CO3:** Ability to recognize the potential of bio composite and biodegradable materials for food packaging and define active and intelligent packaging.

**CO4:** Ability to discuss the role of different regulatory bodies in food packaging and disposal protocols for food packaging.

**Course Name: Functional Foods & Nutraceuticals**

**Course Code: FT 703B**

**Course outcome(s):**

**CO1:** Ability to understand the fundamental concept of Nutraceuticals & Functional Foods on their origin, presence and functionality.

**CO2:** Ability to comprehend the disease preventing and health enhancing properties of Nutraceuticals & Functional Foods.

**CO3:** Ability to apply the basic knowledge to comprehend the manufacturing of various fortified, value-added functional foods and nutraceuticals in different forms for consumption

**CO4:** Ability to analyze the toxicological aspect, related risks in formulating dosage and defining consumption patterns of Nutraceutical & Functional Foods.

**Course Name: Protein Technology**

**Course Code: FT 703C**

**Course outcome(s):**

**CO1:** Ability to define protein structure and properties and to analyze different sources of protein.

**CO2:** Ability to describe protein concentrate and isolate and their functions.

**CO3:** Ability to relate manufacturing of protein hydrolysates and to develop textured protein.

**CO4:** Ability to apply different technique to detect and estimate protein.

**Course Name: PROCESS INSTRUMENTATION**

**Course Code: FT 704A**

**Course outcome(s):**

**CO1:** Able to explain working principle of different measuring instruments.

**CO2:** Able to find the specification of different instruments.

**CO3:** Able to Measure different physical parameters like pressure, temperature, flow rate, level etc

**CO4:** Able to apply the knowledge of measurement in different practical field.

**Course Name: PROCESS CONTROL SYSTEMS**

**Course Code: FT 704B**

**Course outcome(s):**

**CO1:** Demonstrate the fundamentals of control systems

**CO2:** Calculate controller parameters of different controller

**CO3:** Describe different advanced control strategy.

**CO4:** State the operation and use of final control element

**Course Name: FOOD ENGINEERING LAB**

**Course Code: FT791**

**Course outcome(s):**

**CO1:** Ability to define the practical implication of the theoretical ideas regarding basic food engineering phenomenon.

**CO2:** Ability to interpret practical application of the extraction phenomenon related to food processing and to explain the different separation techniques that are used in food industries.

**CO3:** Ability to analyze and operate the driving principles of different types of driers like spray drier, tray drier, drum drier etc. and determine the working parameters required for a desired thermal processes.

**CO4:** Ability to explain the practical use of rheological study in a food based industry

**Course Name: INSTRUMENTATION LAB**

**Course Code: FT792A**

**Course outcome(s):**

After completion of the laboratory course students will be able to:

**CO1:** Able to understand the working principle of different instruments

**CO2:** Able to examine the calibration of different instruments

**CO3:** Able to Measure different physical parameters like pressure, temperature, flow rate, level etc

**CO4:** Able to choose the suitable instrument for measuring different process parameter.

**Course Name: PROCESS CONTROL SYSTEM LAB**

**Course Code: FT792B**

**Course outcome(s):**

After completion of the laboratory course students will be able to:

**CO1:** Explain basic process control loop elements via hands on experiment

**CO2:** Recognize different process control element via hands on experiment

**CO3:** Control different process variable (flow, pressure, level & temperature) using different controller mode

**CO4:** Determine controller parameters for good control through experiment

**Course Name: INNOVATION-PROJECT BASED-SC. TECH, SOCIAL, DESIGN& INNOVATION**

**Course Code: MC 781**

**Course outcome:**

**CO1:** Ability to understand the role of food technologists in societal welfare.

**CO2:** Ability to take up projects which are aimed at providing solutions to societal problems concerning food sector.

**CO3:** Ability to take up projects for improving efficiency in rural work, green technologies, utilization of rural and urban waste

**CO4:** Ability to think about the causes of different societal problems and find out implementable solutions at the institute level

## 8<sup>th</sup> sem

**Course Name: Entrepreneurship Development & start-up management**

**Course Code: FT801A**

**Course outcome(s):**

**CO1:** Understanding opportunities to set-up Food processing industries

**CO2:** Identify the market competitors and conduct and prepare survey reports accordingly.

**CO3:** Design the finance, human resource, and operation strategy for effective market growth

**CO4:** Develop the effective business ecosystem

**Course Name: Project Engineering & Plant Layout**

**Course Code: FT801B**

**Course outcome(s):**

**CO 1:** Demonstrate the concept and different aspect required for food plant design and

**CO 2:** Select appropriate requirement of design and layout for the specific food industry with compliance with FSSAI

**CO 3:** The function of PERT, CPM, ISO and HACCP in food plant design

**CO 4:** Develop a food plant layout with taken into account different legal, economic, social aspects

**Course Name: Principles of Biochemical Engineering**

**Course Code: FT802A**

**Course outcome(s):**

**CO1:** Ability to recognize the industrial implication of biochemical engineering.

**CO2:** Ability to interpret the kinetics of microbial reactions.

**CO3:** Ability to develop the design parameters for a bioreactor.

**CO4:** Ability to illustrate the importance of downstream processing in bioprocess industries and to evaluate the importance of design considerations in a fermentation plant design project and examine scale up operations.

**Course Name: Modeling& Simulation of Food Processing**

**Course Code: FT802B**

**Course outcome(s):**

**CO 1:** Ability to understand the importance of mathematical modeling of food processing operations.

**CO 2:** Ability to utilize theoretical concepts for development of mathematical models and to design error free traditional food process operations.

**CO 3:** Ability to understand and utilize the basic concepts of advanced food processes.

**CO 4:** Ability to select and consider the dependent and independent variables of mathematical processes and use that for process optimization regarding performance enhancement.

**Paper Name: Product Development & Quality Assurance Lab**

**Paper Code: FT892**

**Course outcome(s):**

**CO 1:** Ability to explain the different process controlling parameters that influence a food product development.

**CO 2:** Ability to develop an innovative product or a processing flow and effectively vary the composition for the newly developed product and evaluate the results.

**CO 3:** Ability to identify the importance of shelf life study and perform varied tests to determine the nutritional quality of the newly developed product.

**CO 4:** Ability to recognize the importance of HACCP in the developmental process and establish quality assurance protocols.

**Course Name: Essence of Indian Knowledge Tradition**

**Course Code: MC 801**

**Course Outcomes:**

**CO 1:** Identify the concept of Traditional knowledge and its importance.

**CO 2:** Explain the connection between Modern Science and Indian Knowledge System.

**CO 3:** Understand the importance of Yoga for health care.

**CO 4:** Interpret the effect of traditional knowledge on environment.