

Shivaji University, Kolhapur

Department of Technology

Vision

To be a leader in engineering and technology education, a research centre of global standards to provide valuable resources for industry and society through development of competent technical human resources.

Mission

1. To develop technocrats of national & international stature committed to the task of nation building.
2. To organize teaching learning programs to facilitate the development of competent and committed professionals for practice, research and academics.
3. To undertake collaborative research projects that offer opportunities for consistent interaction with industries.

Name of Programme: B.Tech. (Food Technology)

Program Outcomes

1. **Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
1. **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.
2. **Design/development of Solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations

3. **Conduct Investigations of Complex Problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
4. **Modern Tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
5. **Modern Tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
6. **The Engineer and Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and Sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary 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 the 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

1. Graduates will apply the knowledge of food chemistry, food preservation, food processing and food packaging for the effective utilization of agricultural commodities to develop healthy and nutritious foods
2. Graduates will design economically feasible equipment for the modernization of traditional food processing methods
3. Graduates will apply the knowledge of food engineering and technology principles from the various aspects of food technology and related disciplines to solve practical and real- world problems

Course Outcomes		
Part-I Semester-I		
67895	Engineering Mathematics-I	<ol style="list-style-type: none"> 1. Students in this course will apply the Procedure and methods to solve technical problems. 2. Student can understand how to model real world scenario using Mathematics 3. Students will be able to solve computational problems using Scilab/Matlab.
67896/67942	Engineering Physics	<ol style="list-style-type: none"> 1. The student would be able to apply the concepts of physics in various branches of engineering 2 The student would be able to use the techniques, skills, and modern tools necessary for physics and engineering careers 3. Understands and apply the concepts of light in optical fibers, light wave communication systems, holography. 4. Use lasers as light sources for low and high energy applications. 5. Understand the nature and characteristics of ultrasonic waves and its various engineering applications.
67897/67943	Engineering Mechanics	<ol style="list-style-type: none"> 1. Differentiate between Scalar and Vector Quantities 2. Understand the characteristics of force, system of forces , learn to resolve forces. 3. Understand the moment and couple of forces and effect of moment on rigid body 4. Compute resultant of coplanar concurrent and non-concurrent force system. 5. Distinguish between C.G. and Centroid, Compute moment of inertia of plane figures and composite figures. 6. Understand and analyze beam as a structure and compute support reactions using Lami's theorem & equilibrium Conditions for concurrent, parallel and general force system. 7. Understand Truss as a structural member and analyze plane trusses by the method of joints And sections 8. Understand the concept of dynamic as applied to

		<p>particle.</p> <p>9. Introduce & define Kinematics of Rigid body, get idea about translation, rotation, general Plane motion</p> <p>10.To Know principle of work.</p>
67899/67945	Electronic Component Devices	<ol style="list-style-type: none"> 1. 1 Understand the basics of Electronics component, different materials and their applications. 2. Understand the construction , V-I characteristics and application of semiconductor devices 3. Analyze different electronic circuits based on diode , transistor and SCR 4. Explain the working principle, construction, applications of relays, display devices and transducer. 5. Test and verify results of diode and BJT circuits
67898/67944	Fundamentals of Mechanical Engineering	<ol style="list-style-type: none"> 1. Recall the terms, basic concepts and laws of thermodynamics. 2. Explain the working of various mechanical systems like I.C.Engines, Refrigeration and air conditioning systems, power plants, energy conversion devices and power transmission devices. 3. Explain various types of manufacturing processes. 4. Explain heat and mass transfer and its modes of transfer. 5. Analyze power transmission devices with their functions.
67900/67946	Lab-I Engineering Physics	<ol style="list-style-type: none"> 1.The student would be able to use spectrometer, polar meter, LASER, photodiode for various measurements. 2.Test optical components using principles of interference and diffraction of light 3.Determine the width of narrow slits, spacing between close rulings using lasers and appreciate the accuracy in measurements. 4.Use ultrasonic interferometer for measuring velocity of ultrasound in various liquids.
67901/67947	Lab.-II Engineering	<p>After successful completion of this course, the student will able to:</p>

	Mechanics	<ol style="list-style-type: none"> 1. Verify and correlate law of polygon of forces. 2. Verify Lami's theorem. 3. Verify Equilibrium conditions. 4. Determine coefficient of friction for two sliding surfaces. 5. Verify Law of Moments. 6. Find value of local gravitational acceleration.
67902/67948	Lab.-III Fundamentals of Mechanical Engineering	<ol style="list-style-type: none"> 1. Explain and demonstrate the working of various mechanical systems like I.C.Engines, Refrigeration and air conditioning systems, power plants and steam generators. 2. Explain and demonstrate the construction and working of mechanical power transmission devices. 3. Explain and demonstrate the construction and working of energy conversion devices. 4. Explain and demonstrate the manufacturing processes.
67903/67949	Lab.-IV Electronic Components of Devices	<ol style="list-style-type: none"> 1. Understand the diode and transistor characteristics. 2. Verify the rectifier circuits using diodes and filter circuits. 3. Design various amplifiers like CE, CC, common source amplifiers 4. Study experimentally the characteristics of SCR and JFET
67904/67950	Lab-V Professional Communication	<ol style="list-style-type: none"> 1. Students will be able to communicate language effectively. 2. Students learn to use grammar rules in spoken and written English. 3. Students will be able to learn personality traits and soft skills. 4. Students acquire required skills for technical writings. 5. Students learn fluency and pronunciation. 6. Students acquire techniques for presentation skills.
67905/67951	Lab- VI Matlab & Scilab	<ol style="list-style-type: none"> 1. To familiarize the student in introducing and exploring MATLAB & SCILAB software's. 2. Understand the main features of the MATLAB and SCILAB 3. To enable the student on how to approach for solving Engineering Mathematics problems using MATLAB and SCILAB.

		<ol style="list-style-type: none"> 4. To solve complicated numerical problems by writing MATLAB and SCILAB programs 5. Interpret and visualize simple mathematical functions and operations using MATLAB and SCILAB.
Part-I Semester-II		
67931	Engineering Mathematic-II	<ol style="list-style-type: none"> 1. Students in this course will apply the Procedure and methods to solve technical problems 2. Student can understand how to model real world scenario using Mathematics. 3. Students will be able to solve computational problems using Scilab/Matlab.
67932/67906	Engineering Chemistry	<p>After successful completion of this course, the student will able to:</p> <ol style="list-style-type: none"> 1 Have knowledge of water quality parameters and water softening processes, and calculate hardness of water. 2 Classify and describe properties and applications of engineering material. 3 Explain mechanism and properties of lubricants and select lubricants for different service conditions. 4 Understand the mechanism and control methods of corrosion and apply their knowledge for protection of different metals from corrosion. 5 Use instrumental methods for the analysis of material.
67933/67907	Fundamental Of Civil Engineering	<ol style="list-style-type: none"> 1. Understand how civil engineering is related to other branches. 2. Find out linear and angular measurements required to prepare a plan or map by using traditional as well as modern instruments. 3. Find out vertical distances, reduced levels and angles by using total station. 4. Calculate area of irregular surface by using Mechanical and Digital Planimeter. 5. Identify building materials required for construction with current market rates. 6. Understand use, necessity of submission and working drawing. 7. Prepare site visit report.
67935/67909	Fundamental Of Electrical Engineering	<ol style="list-style-type: none"> 1. Develop fundamental understanding about basics of DC and AC circuit .

		<ol style="list-style-type: none"> 2. Differentiate between electrical and magnetic circuit. 3. Explain the working principle, construction, applications of DC machines and AC machines. 4. Understand electrical power system, wiring and Ear thing . 5. Apply different circuit laws to solve electrical circuits and verify results experimentally .
67934/67908	Engineering Graphics	<ol style="list-style-type: none"> 1. Identify basic concepts of BIS conventions and their application. 2. Interpret first angle and third angle projection system. 3. Construct orthographic projections of points, lines and planes. 4. Apply principles of projection and construct orthographic and isometric views of an object. 5. Develop a skill of visualization to understand and read the drawing.
67936/67910	Lab-I Engineering Chemistry	<ol style="list-style-type: none"> 1 Apply basic concepts of chemistry for analysis. 2 Determine the various water quality parameters and preparation of polymers 3 Determine the viscosity of liquid 4 Estimate the amount of copper and zinc from brass solution 5 Understand the use of instrumental methods for analysis of the material
67937/67911	Lab-II Fundamental of Civil Engineering	<p>After successful completion of this course, the student will able to:</p> <ol style="list-style-type: none"> 1. Understand how civil engineering is related to other branches. 2. Find out linear and angular measurements required to prepare a plan or map by using traditional as well as modern instruments. 3. Find out vertical distances, reduced levels and angles by using total station. 4. Calculate area of irregular surface by using Mechanical and Digital Planimeter. 5. Identify building materials required for construction with current market rates. 6. Understand use, necessity of submission and working drawing. 7. Prepare site visit report.
67938/67912	Lab. -III Engineering Graphics	<ol style="list-style-type: none"> 1. Identify and implement basic concepts of BIS conventions to sketch Engineering drawing. 2. Create geometric constructions with hand tools.

		<p>3. Construct orthographic projection and sectional view of a machine part.</p> <p>4. Create isometric projection from multiview drawings of an object.</p> <p>5. Sketch projection of solids and development of lateral surfaces of solids.</p>
67939/67913	Lab.- IV Fundamental Of Electrical Engineering	<p>After completing this course the student will be able</p> <ol style="list-style-type: none"> 1) Perform and measure the basic electric circuit experiment with knowledge of fundamental laws 2) Demonstrate behavior of R,L, C,AC circuit. 3) Understand use of various electrical measuring instruments. 4) Understand application of DC machines and testing of single phase transformer.
67940/67914	Lab.-V Workshop Practice	<ol style="list-style-type: none"> 1. Execute safety measures, while working in a workshop. 2. Identify and use of various hand tools and measuring instruments. 3. Demonstrate and use of different fitting tools and prepare a fitting job as per given drawing. 4. Demonstrate and use of different Carpentry tools and prepare a wooden job as per given drawing. 5. Perform Arc welding operation to prepare a welding joint.
67941/67915	Lab.-VI Computer Programming	<ol style="list-style-type: none"> 1. Illustrate the flowchart and design of an algorithm for a given problem and to develop C programs using operators. 2. Develop conditional and iterative statements to write C programs. 3. Design C programs with the use of Pointers to access arrays, strings and functions. 4. Exercise user defined data types including structures and unions to solve problems. 5. Design C programs using pointers and to allocate memory using dynamic memory management. 6. Demonstrate files concept to show input and output of files in C.

Part-II Semester-III		
Course code 70174	Course title Principles of Food Preservation	<ol style="list-style-type: none"> 1. Understanding of the need for food preservation and processing. 2. Understanding of the different preservation technique 3. Knowledge of the principles of food spoilage and the ways to prevent 4. Understanding of identification & selection of appropriate processing equipments and preservation methods for the specific foods 5. Knowledge indirect approaches to food preservation: packaging, hygienic design, sanitation, GMP 6. Understanding of SOPs and SSOPs during laboratory exercise.
Course code 70175	Course title Engineering Mathematics-III	<ol style="list-style-type: none"> 1. Solve Linear Differential Equations and apply them to realistic problems. 2. Solve Partial Differential Equations for solving problems in Food Engineering. 3. Understand Application of Laplace transform and Probability in Process Instrumentation Dynamics and Control. 4. Apply knowledge of Vector Calculus to solve engineering problems.
Course code 70176	Course title Food Microbiology	<ol style="list-style-type: none"> 1. Better understanding of various microbes associated with food and food groups. 2. Familiarize the role of microbes in food spoilage and food preservation. 3. Obtain Knowledge in methods to detect pathogens in food. 4. Describe the beneficial role of microorganisms in fermented foods and in food processing. 5. Utilize laboratory techniques to detect, quantify, and identify microorganisms in foods. 6. Acquire, discover, and apply the theories and principles of food microbiology in practical, real-world situations and problems. 7. Develop success skills in communication, critical thinking, interaction, information

		acquisition and interpretation, organization, professionalism, leadership, auto-didactics and life-long-learning
Course code 70177	Course title Food Chemistry	<ol style="list-style-type: none"> 1. The chemistry of food to control a chemical and biochemical reaction that influence food quality 2. The principles behind analytical techniques associated with food components and related problems 3. The role of food nutrients and its use for preservation of food (concepts emphasized in a laboratory experiment) 4. To study the basic nutrients and their requirements for human nutrition 5. Evaluate new product development. 6. Demonstrate practical proficiency in a food analysis laboratory.
Course code 70178	Course title Heat Transfer	<ol style="list-style-type: none"> 1. To introduce the course with respect to importance of professional ethics, engineering design, communications and teamwork, use of modern tools and life-long learning and further to understand, identify and explain three modes of heat transfer namely conduction, convection and radiation. 2. To formulate the equations for calculating heat flux for conduction, convection, radiation, boiling, condensation. 3. To apply knowledge and information gained on design and analysis of Heat transfer systems, further to interpret and select the type of heat transfer system and to evaluate heat transfer rates. 4. To understand phase-change phenomena and latent heat of vaporization, including free convective, nucleate and film boiling, as well as drop wise and film condensation. 5. To understand, distinguish and describe different types of evaporators further to assess, select evaporators for specific duty and to improve their performance through heat transfer knowledge 6. To construct the governing equations for designing and analyzing heat transfer

		equipment and to further make selection of heat exchangers also to think of possible rearranging or redesign of the heat transfer systems to save energy.
Course code 70179	Course title Principles of Food Preservation Laboratory	<ol style="list-style-type: none"> 1. To identify & select processing equipment and preservation methods appropriate for specific foods. 2. To describe the effects of preservation methods on the quality of food 3. Food Product Development Exercise 4. To implement preservation methods that make use of heat/cold, drying, acid, added chemicals, controlled air, pressure, and high energy radiation 5. To identify indirect approaches to food preservation: packaging, hygienic design, sanitation, GMP 6. To use SOPs and SSOPs during laboratory exercise 7. To identify quality-loss mechanisms as biological, chemical, and physical.
Course code 70180	Course title Food Microbiology Laboratory	<ol style="list-style-type: none"> 1. Complete understanding of isolation, characterization of various microbes associated with foods and food groups. 2. Familiarize with microbiological techniques for the study of foods. 3. Better understanding of methods to detect pathogens in foods. 4. Students should be able to significance and activities of microorganisms in food. 5. Students should be able to microbiology of different types of food commodities. 6. Students should be able to: Describe the characteristics of food borne, waterborne and spoilage microorganisms, and methods for their isolation, detection and identification.
Course code 70181	Course title Food Chemistry Laboratory	<ol style="list-style-type: none"> 1. Better understanding of physical and chemical properties of food. 2. Familiarize in precipitation of casein and gelation of starch. 3. Laboratory exercises on specific analytical problems.

		<p>4. Understand proper use of methods of analytical analyses</p> <p>5. Understand various methodologies for analysis of various components in foods</p> <p>6. Understand how government regulations affect analysis of components in food.</p>
<p>Course code</p> <p>70182</p>	<p>Course title</p> <p>Heat Transfer Laboratory</p>	<ol style="list-style-type: none"> 1. Understanding fundamentals of some major Heat transfer operations through practical work. 2. Getting set for practical heat transfer operations. 3. Application of heat transfer design principles and be mechanic for heat transfer devices. 4. Building foundation for process intensification and be adapted to handle heat transfer operations. 5. Learning to work in group and imitate Standard Operating Procedure for practical work v.i.z. responding to the guide. 6. Motivation towards innovations for novel systems of heat transfer.
<p>Course code</p> <p>70183</p>	<p>Course title</p> <p>Programming practices for Food Technologists</p>	<ol style="list-style-type: none"> 1. Students will be able to Design, create, build, and debug Visual Basic applications. 2. Students will be able to Explore Visual Basic's Integrated Development environment (IDE). 3. Students will be able to implement syntax rules in Visual Basic programs. 4. Explain variables and data types used in program development. 5. Apply arithmetic operations for displaying numeric output. 6. Apply procedures, sub-procedures, and functions to create manageable code.
<p>Course code</p>	<p>Course title</p> <p>Environmental Studies</p>	<ol style="list-style-type: none"> 1. Develop an understanding of different natural resources including renewable resources. 2. Realize the importance of ecosystem and biodiversity for maintaining ecological balance. 3. Aware of important acts and laws in respect of environment. 4. Demonstrate critical thinking skills in relation to environmental affairs

		<ol style="list-style-type: none"> 5. Develop an understanding of environmental pollutions and hazards due to engineering/technological activities and general measures to control them. 6. Demonstrate knowledge and application of communication skills and the ability to write effectively in a variety of environmental contexts. 7. Demonstrate an ability to integrate the many disciplines and fields that intersect with environmental concerns. 8. Demonstrate an appreciation for need for sustainable development and role of science.
Course code 70184	Course title Soft Skills Development	<ol style="list-style-type: none"> 1. Students are able to expertise in self development, effective communication skills and interview skills 2. Understand how to handle situation and take decision 3. Equip to any sort of interviews particularly job interviews 4. Acquaintance with documentation skills 5. Become self reliant and responsible 6. Team build up, its development and management
Part-II Semester-IV		
Course code 70185	Course title Food Process Engineering - I	<ol style="list-style-type: none"> 1. Students will have understanding of all unit operations and its applications in food processing 2. Students will have ability to calculate the effectiveness and the amount of heat exchanged in heat exchangers under various flow conditions and determination of the ideal conditions for heat transfer 3. Students will have ability to calculate the amount of mass going into the system and coming out of the system for the processing of products 4. Students will have the knowledge of the food processing equipment used for the different unit operations. 5. Students will have ability to describe how various unit operations work individually and together.

		6. Students will have understanding of the principles in solving the problems of food processing industries
Course code 70186	Course title Food Additives and Contaminants	<ol style="list-style-type: none"> 1. Better understanding of the functions of different food additives in improving shelf life, quality, texture and other physical and sensory characteristics of foods. 2. Exposure about food additives related to bakery and confectionary. 3. Exposure about types and chemical properties of pigments, flavoring compounds and their processing effect. 4. Provide students with a basic understanding of the principles of food toxicology. 5. Identification of appropriate techniques for analysis of additives 6. Recognize the common analytical techniques for detection of food adulterant
Course code 70187	Course title Food Biochemistry	<ol style="list-style-type: none"> 1. Understand the chemistry underlying the properties and reactions of various food components 2. To describe the biochemistry process, basic concept of nutrients and the relationship of the consumption of foods to nutritional status and health 3. Identify some of common reaction mechanisms in biochemical processes 4. Describe how enzymes work and know how to determine basic enzyme kinetics 5. Analyze and predict how the composition and conditions within a food influence the functional properties of food molecules. 6. Comprehend the degree of knowledge that is being acquired through current research in understanding how cells function
Course code 70188	Course title Human Nutrition	<ol style="list-style-type: none"> 1. Better understanding in physiological and metabolic functions of nutrients 2. Familiarize nutritional assessment, RDA and Dietary Recommendations & guidelines. 3. Understanding of energy and water balance 4. Understanding of malnutrition, their causes and nutrition education

		<p>5. Effective understanding of Diet planning Principles, exchange lists, food labels and Nutritional facts for balanced nutrition and healthy diets</p> <p>6. Understanding of Undesirable Constituents & toxic substances and their disorders.</p>
Course code 70189	Course title Fluid Mechanics	<ol style="list-style-type: none"> 1. An understanding of fluid mechanics fundamentals, including concepts of mass and momentum conservation. 2. An ability to apply the Bernoulli equation to solve problems in fluid mechanics. 3. An ability to apply control volume analysis to problems in fluid mechanics. 4. An ability to use potential flow theory to solve problems in fluid mechanics. 5. An ability to perform dimensional analysis for problems in fluid mechanics. 6. Knowledge of laminar and turbulent boundary layer fundamentals. 7. An understanding of how fluid mechanics apply to biological, environmental, and micro-fluid systems
Course code 70190	Course title Food Process Engineering-I Laboratory	<ol style="list-style-type: none"> 1. Students will have the understanding the calculations of mass balance and energy balance of food processes 2. Students will have the understanding of basic principles of unit operations 3. Students will have the understanding of practical experience of various equipment
Course code 70191	Course title Food Activities and Contaminants Lab	<ol style="list-style-type: none"> 1. Recognize the common analytical techniques for detection of food adulterant 2. Detection of different types of vitamins, pigments. 3. Identification of appropriate techniques for analysis 4. Detection of different properties of protein, starch, fat 5. Understanding the effect of emulsifier, hydrocolloids as food additive. 6. Knowledge of regulations and the monitoring agencies involved in controlling the safer use of Additives in foods.

<p>Course code 70192</p>	<p>Course title Food Biochemistry Laboratory</p>	<ol style="list-style-type: none"> 1. The student will be able to evaluate the food component on qualitative and quantitative basis. 2. Be able to know the laboratory techniques and different methodology for biological assay. 3. The student will be able to apply principles of laboratory techniques. 4. The student will be able to identify appropriate techniques for analysis. 5. Have sufficient knowledge of food biochemistry to control reactions in foods. 6. Develop a practical proficiency in a food biochemistry and analysis laboratory
<p>Course code 70193</p>	<p>Course title Human Nutrition Laboratory</p>	<ol style="list-style-type: none"> 1. Understanding of methods used to assess nutrition status 2. Familiarize nutritional assessment, RDA and Dietary Recommendations & guidelines. 3. Understanding and determining BMR and body surface area 4. Understanding of food composition and energy balance in dietary planning 5. Effective understanding of diet plan formulation for health and for nutrition-related disorders. 6. Identifying appropriate techniques for Biochemical analysis of blood, urine
<p>Course code 70194</p>	<p>Course title Fluid Mechanics Laboratory</p>	<ol style="list-style-type: none"> 1. An understanding of fluid mechanics fundamentals, including concepts of mass and momentum conservation 2. An ability to apply the Bernoulli equation to solve problems in fluid mechanics. 3. An ability to apply control volume analysis to problems in fluid mechanics. 4. An ability to use potential flow theory to solve problems in fluid mechanics. 5. An ability to perform dimensional analysis for problems in fluid mechanics. 6. Knowledge of laminar and turbulent boundary layer fundamentals. 7. An understanding of how fluid mechanics applies to biological, environmental, and

		micro-fluidic systems
Course code 69847	Course title Environmental Studies	<ol style="list-style-type: none"> 1. Develop an understanding of different natural resources including renewable resources. 2. Realize the importance of ecosystem and biodiversity for maintaining ecological balance. 3. Aware of important acts and laws in respect of environment. 4. Demonstrate critical thinking skills in relation to environmental affairs 5. Develop an understanding of environmental pollutions and hazards due to engineering/technological activities and general measures to control them. 6. Demonstrate knowledge and application of communication skills and the ability to write effectively in a variety of environmental contexts. 7. Demonstrate an ability to integrate the many disciplines and fields that intersect with environmental concerns. 8. Demonstrate an appreciation for need for sustainable development and role of science.
Course code 70195	Course title Introduction to Performing Arts	<ol style="list-style-type: none"> 1. Students will be able to learn Fundamentals and types of Music and other allied arts. 2. Students will be able to analyze, appreciate, and interpret significant works of art. 3. Students will demonstrate critical thinking through analysis and evaluation of works of art. 4. Students will develop good listening and viewing skills. 5. Students will be able to understand the 'Gharana' system in Music. 6. Students will understand the classification of Musical instruments. 7. Students will demonstrate mastery of their designated area of concentration. 8. Students will demonstrate comprehension of global perspectives in visual culture
Course Outcomes		
Part-III Semester-V		

<p>Course code 70887</p>	<p>Course title Food Packaging</p>	<ol style="list-style-type: none"> 1. Students will have understandings of the various properties of food packaging materials 2. Students will have an ability to select suitable packaging material for different food substances 3. Students will have understandings of role and function of packaging materials used for a range of consumer food needs and wants 4. Students will able to relate the properties of food packages to conversion technologies, processing and packaging technologies and user requirements including safety, convenience and environmental issues. 5. Students will able to describe the technology involved in the production, shaping and printing of various packaging materials and package 6. Students will have an understanding of different materials used for different purposes.
<p>Course code 70887</p>	<p>Course title Fruits and Vegetables Processing Technology</p>	<ol style="list-style-type: none"> 1. Students will able to preserve the fruits and vegetables and make their products to make available them in off season. 2. Student will able to provide solution for spoilage of fruit and vegetables while handling and storage 3. Students will able to learn storage of fruits and vegetables in perfect consumable condition for a longer time without change in its nutritional value. 4. Students will learn to extend the shelf life of the fruits and vegetable products with use of various preservation techniques 5. Students will learn to prepare value added products from the fruits and vegetables so that farmers will get more income 6. Students will learn to develop ability for formulation of products, and will learn to solve agriculture and engineering problems.
<p>Course code 70888</p>	<p>Course title Dairy Technology</p>	<ol style="list-style-type: none"> 1. Students will have an understanding of process invovled in production of milk and milk products 2. students will able to classify and explain the different types of milk products 3. Students will have an understanding of purpose and functions of Hygiene in dairy

		<p>Industry</p> <ol style="list-style-type: none"> 4. students will able to apply engineering principle and concepts to handle store and processs of milk and milk products 5. Students will able to understand the importance of quality control in dairy industry 6. Students will able to become entruprenur in Dairy Industry
<p>Course code 70889</p>	<p>Course title Food Processing Engineering-II</p>	<ol style="list-style-type: none"> 1. Students will be able to know the machines/equipment used for the different unit operations in food processing carry out some of the basic unit operations in food processing 2. Students will have understanding of specific processing technologies used for various food products 3. Students will develop an ability to identify, formulate, and solve engineering problems 4. Students will have a comprehensive understanding of the aspects required to be controlled during food processing. 5. Students will have problem evaluation and problem solving skills regarding food processing operations that can affect the quality of foods 6. Students will have developed self-learning and practical proficiency and team work in food processing techniques to specific commodities and industrial plant unit operations
<p>Course code 70890</p>	<p>Course title Process Instrumentation, Dynamics and Control</p>	<ol style="list-style-type: none"> 1. The student will be able to understand working principles of basic instruments available for flow, pressure, level and temperature measurement 2. The student will be able to model dynamical systems. 3. The students will be able to understand the use and measurement of transfer functions 4. The students will be able apply knowledge of mathematics [Laplace Transforms] to model and solve the models describing dynamics of chemical processes. 5. The students will be able to evaluate stability of control loops. 6. The students will be able to understand

		dynamic behavior and stability of food and chemical process control systems
Course code 70891	Course title Food Packaging Laboratory	<ol style="list-style-type: none"> 1. The students will understand the food unit operation i.e. packaging use in food process industries. 2. Students will be able to know and apply the machines/equipment used for the different packaging materials. 3. The students will have the practical proficiency in a food packaging units. 4. Students will have an ability to identify, formulate, and solve packaging problems 5. Students will have problem evaluation and problem solving skills regarding food packaging operations that can affect the quality of foods. 6. Students will have developed self-learning and practical proficiency and team work in food processing techniques.
Course code 70892	Course title Fruits And Vegetables Processing Technology Laboratory	<ol style="list-style-type: none"> 1. The students will understand the processing of fruits and vegetable products followed in food industries. 2. Students will be able to know and apply the machines/equipment used for the different unit operations in fruits and vegetable processing industry. 3. The students will have the practical proficiency in a fruits and vegetable processing units. 4. Students will have an ability to identify, formulate, and solve agricultural and industrial problems. 5. Students will have problem evaluation and problem solving skills regarding fruits and vegetables processing operations that can affect the quality of products. 6. Students will have developed self-learning and practical proficiency and team work in fruits and vegetables processing techniques.
Course code 70893	Course title Dairy Technology Laboratory	<ol style="list-style-type: none"> 1. Explain processes involved in production of milk and milk products 2. Classify and explain the different types of milk products

		<ol style="list-style-type: none"> 3. Understand purpose and functions of hygiene in dairy industry 4. Produce flow chart for the production processes of various milk products 5. Be able to explain organization and operations involved in milk processing unit 6. Precautions that should be taken when processing milk and dairy products
Course code 70894	Course title Food Process Engineering-II laboratory	<ol style="list-style-type: none"> 1. Better understanding of food unit operation applied in food process industries 2. Students will be able to know and apply the machines/equipment used for the different unit operations in food processing 3. The students will have the practical proficiency in a food processing units 4. Students will have an ability to identify, formulate, and solve engineering problems 5. Students will have problem evaluation and problem solving skills regarding foodprocessing operations that can affect the quality of foods 6. Students will have developed self-learning and practical proficiency and team work in food processing techniques.
Course code 70895	Course title Process Instrumentation, Dynamics and Control Laboratory	<ol style="list-style-type: none"> 1. Understand and discuss the importance of process control in process operation and the role of process control engineers 2. Understand and design the modem hardware and instrumentation needed to implement process control. 3. Develop mathematical models of chemical and biological processes by writing unsteady-state mass and energy balances. 4. Recognize unit operations and effect of other parameters on them. 5. Evaluate instrumentation and control related with the unit operations. 6. Identify unit operations used in different industries
Course code 70896	Course title Introduction To Foreign Language	<ol style="list-style-type: none"> 1. The students will be able to acquire a good knowledge the basic grammar of foreign language and learn Alphabet, Common Words and

		<p>Phrases in foreign language.</p> <p>2. The students will also be able to learn to read the simple texts in foreign language.</p> <p>3. The students would be able to speak a little using the greetings, well wishes etc. in Foreign Language.</p> <p>4. The students will learn to count numbers, answer to the questions like, what is your name, surname, tell age, and can initiate little communication in Foreign Language.</p> <p>5. The students can also translate simple sentences in foreign language</p>
Course code 71763	Course title Internship-I	<p>1. Acquaint to actual working environment.</p> <p>2. Acquire ability to utilize technical resources.</p> <p>3. Write technical documents and give oral presentations related to the work completed.</p> <p>4. Develop attitude of a team player and aptitude for lifelong learning</p>
Part-III Semester- VI		
Course code 70898	Course title Sugar And Confectionery Technology	<p>1.Students will able to explain processes involved in production of cocoa processing and chocolate manufacturing</p> <p>2.Students will able to classify and explain the different types of Sugar and confectionary products</p> <p>3.Students will able to understand purpose and functions of hygiene in cocoa processing and chocolate manufacturing industry</p> <p>4.Students will able to produce flow chart for the production processes of various Sugar and confectionary products</p> <p>5.Students will able to explain organization and operations involved in Sugar and chocolate manufacturing industry</p> <p>6.Students will have an ability to handle confectionary products and check quality in process line</p>
Course code 70899	Course title Technology of Cereals and Bakery Products	<p>1.Students will able to identify the structure of cereal grains and their components.</p> <p>2.Students will able to process cereal grains into raw materials for bakery products.</p> <p>3.Students will have understanding of the important quality attributes and quality</p>

		<p>indicators of cereals</p> <p>4. Students will have understanding of operating procedures of cereal mill and quality lab</p> <p>5. Students will be able to process cereals into bakery products</p> <p>6. Students will have an ability to identify the common faults and causes in Bakery products</p>
<p>Course code 70900</p>	<p>Course title Biochemical Engineering</p>	<ol style="list-style-type: none"> 1. Describe and identify the main groups of microorganisms 2. Describe and compare the different structures and growth modes of diverse microorganisms 3. Describe and explain how (microbial) genetics determines microbial metabolic and functional activity. 4. Describe and explain how (microbial) genetics determines microbial metabolic and functional activity. 5. Calculate yield and production rates in a biological production process, and also interpret data. 6. Undertake a range of practical approaches associated with microbiology and biochemistry e.g. microbial isolation and culture, microscopy biochemical and genetic analyses and be able to record, describe, present and explain data
<p>Course code 70901</p>	<p>Course title Process Equipment Design And Drawing</p>	<ol style="list-style-type: none"> 1. Display an understanding of the principles of process equipment design, the mechanical aspects of the design and operation of process equipment, including safety considerations 2. Students will have completed detailed designs of several unit operations 3. Students should be able to develop process flow sheets and lay out of equipment and pipelines in chemical process plants 4. Students should be able to design equipment in compliance with regulations and standards 5. Students should be able to produce

		<p>equipment specification sheets and equipment drawing.</p> <p>6. Ability to utilize a systems approach to design and operational performance</p>
<p>Course code 70902</p>	<p>Course title Industrial Economics And Management</p>	<ol style="list-style-type: none"> 1. The students will able to demonstrate the concepts of Management and organizational structure 2. The students will understand the economic and operations management concepts useful in the production process. 3. The students will apply the project management tools in effective development and implementation of the business activities 4. The students will able perform supply and demand analysis in input factor markets with varying market structures; 5. The students will be able to carry out and evaluate benefit/cost, life cycle and breakeven analyses on one or more economic alternatives. 6. The students will have entrepreneurial spirit and plan to start their own enterprise
<p>Course code 70903</p>	<p>Course title Sugar Confectionery Technology Laboratory</p>	<ol style="list-style-type: none"> 1. Explain processes involved in production of cocoa processing and chocolate manufacturing 2. Classify and explain the different types of Sugar and confectionary products 3. Understand purpose and functions of hygiene in cocoa processing and chocolate manufacturing industry 4. Produce flow chart for the production processes of various Sugar and confectionary products 5. Be able to explain organization and operations involved in Sugar and chocolate manufacturing industry 6. Precautions that should be taken when processing Sugar and confectionary industry
<p>Course code</p>	<p>Course title</p>	<ol style="list-style-type: none"> 1. Understand the structure of the wheat and

70904	Technology of Cereals and Bakery Products Laboratory	<ul style="list-style-type: none"> rice grains. 2. Able to characterize minor cereal grains 3. Able to evaluate quality of cereal products 4. Able to develop packaging for bakery products 5. Students will gain knowledge about cereal processing into products 6. Able to develop functional bakery products
Course code 70905	Course title Biochemical Engineering Laboratory	<ul style="list-style-type: none"> 1. Describe and identify the main groups of microorganisms 2. Describe and compare the different structures and growth modes of diverse microorganisms 3. Describe and explain how (microbial) genetics determines microbial metabolic and functional activity. 4. Describe key biochemical and cellular components and biochemical pathways 5. Calculate yield and production rates in a biological production process and also interpret data. 6. Undertake a range of practical approaches associated with microbiology and biochemistry e.g. microbial isolation and culture, microscopy biochemical and genetic analyses and be able to record, describe, present and explain data
Course code 70906	Course title Process Equipment Design And Drawing Laboratory	<ul style="list-style-type: none"> 1. Understand the design of important components 2. Display an understanding of the principles of process equipment design, the mechanical aspects of the design and operation of process equipment, including safety considerations 3. Students will have completed detailed designs of several unit operations 4. Students should be able to develop process flow sheets and lay out of equipment and pipelines in chemical process plants 5. Students able to design heat transfer equipments understand heat exchanger

		<p>sizing and develop a heat exchanger data sheet.</p> <p>6. Students ability to design storage vessels and various parts of vessels (e.g. heads, bottom plate)</p>
<p>Course code 70907</p>	<p>Course title Mini Project</p>	<p>1. Develop the ability to choose the problem and formulate it.</p> <p>2. Apply their fundamental knowledge according to their competency for solve engineering problems.</p> <p>3. Develop their leadership quality.</p> <p>4. Achieve the project's goals.</p> <p>5. Prepare a technical report based on the Mini project.</p> <p>6. Deliver technical seminar based on the Mini Project work carried out</p>
<p>Course code 70908</p>	<p>Course title Research Methodology</p>	<p>1. Will be able to understand some basic concepts of research and its methodologies;</p> <p>2. Will be able to identify appropriate research topics;</p> <p>3. Will be able to select and define appropriate research problem and parameters;</p> <p>4. Will be able to prepare a project proposal (to undertake a project);</p> <p>5. Will be able to organize and conduct research (advanced project) in a more appropriate manner</p>