

DHANALAKSHMI SRINIVASAN ENGINEERING COLLEGE

(AUTONOMOUS)

(Approved by AICTE & Affiliated to Anna University, Chennai)

Accredited with 'A' Grade by NAAC, Accredited by TCS

Accredited by NBA with BME, ECE & EEE

PERAMBALUR - 621 212. Tamil Nadu.

website : www.dsengg.ac.in



DEPARTMENT OF FOOD TECHNOLOGY

REGULATION -2020

Vision and Mission of The Department:

Vision:

Prepare the food engineers to pursue their goals and to have successful career as competent technologist, scientist, researchers, entrepreneurs and personalities which benefits the public welfare through rigorous service in their challenging field.

Mission:

M 1: Upgrade the scientific knowledge with a lifelong follow up in the areas of food science, food processing and safety for the development of food products through quality research.

M 2: Extend to know how to identify and analyse the opportunities in Food Technology to adopt strategies that ensure socio-economic growth by collaborating with industries.

M 3: Providing research and professional services to streamline and optimize operations which contribute to the enhancement of the quality of life.

M4: Develop socially responsible professionals and entrepreneurs who are capable of sustainable engineering practices for food industry.

Program Educational Objectives (PEOs)

This Course is conducted to achieve the following Programme Educational Objectives (PEOs):

PEO 1. Student will be able to pursue higher education in India or abroad in the field of Food Technology and it's related field and take up the competitive exams.

PEO2: Student will be able to come up with solutions for any technical and scientific problems related to Food Technology in institution, industry and society.

PEO3: Student will get familiarized in job related skills like communication, designing of experiments and entrepreneur skills in the field of food technology.

Program Outcomes (POs)

- PO1 Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- PO2 Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- PO3 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.
- PO4 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.
- PO5 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..
- PO6 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.
- PO7 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.
- PO8 Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
- PO9 Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- PO 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.
- PO 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.
- PO12 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):

PSO1: Apply basic skills and knowledge in Engineering to develop innovative food processing techniques and food products.

PSO2: Adapt multidisciplinary approaches to solve food industry problems and ensure food quality and safety.

PSO3: Develop critical thinking and problem-solving skills in the domain of food technology with professional integrity and ethical values.

Course Outcomes (Cos) of All Courses.

Autonomous Regulation – R2020

S.NO	COURSE CODE.	SUBJECT CODE	COURSE TITLE
1	C101	U20HS101	Communicative English
2	C102	U20MA101	Engineering Mathematics
3	C103	U20PH101	Engineering Physics - I
4	C104	U20CY101	Engineering Chemistry
5	C105	U20GE101	C- Programming
6	C106	U20GE102	Engineering Graphics
7	C107	U20BS101	Physics and Chemistry Laboratory
8	C108	U20GE103	C-Programming Laboratory
9	C109	U20HS201	Functional English
10	C110	U20MA201	Advanced Calculus and Ordinary Differential Equations
11	C111	U20PH201	Engineering Physics - II
12	C112	U20GE201	Python Programming
13	C113	U20FT201	Fundamentals of Bio -Chemistry
14	C114	U20FT202	Microbiology
15	C115	U20GE203	Engineering Practices Laboratory
16	C116	U20GE204	Python Programming Laboratory
17	C117	U20FT203	Fundamentals of Bio Chemistry Laboratory.
18	C201	U20MA301	Transforms and Partial Differential Equations
19	C202	U20FT301	Food Process Calculations
20	C203	U20FT302	Unit Operations in Food Processing
21	C204	U20FT303	Food Science and Nutrition
22	C205	U20FT304	Fluid Mechanics
23	C206	U20FT305	Thermodynamics
24	C207	U20FT306	Unit Operations Laboratory
25	C208	U20FT307	Food Science and Nutrition Laboratory
26	C209	U20HS301	Interpersonal Skills/Listening and Speaking
27	C210	U20MA403	Probability and Statistics
28	C211	U20HS202	Environmental Science and Engineering
29	C212	U20FT401	Fundamentals of Heat and Mass Transfer
30	C213	U20FT402	Food Microbiology
31	C214	U20FT403	Food Chemistry
32	C215	U20FT404	Properties of Food Materials
33	C216	U20FT405	Heat and Mass Transfer Laboratory
34	C217	U20FT406	Food Microbiology Laboratory
35	C218	U20HS401	Advanced Reading and Writing

36	C301	U20FT501	Food Analysis
37	C302	U20FT502	Refrigeration and Cold Chain Management
38	C303	U20FT503	Food Processing and Preservation
39	C304	U20FT512	Fermentation Technology
40	C305	U20FT504	Food Analysis Laboratory
41	C306	U20FT505	Food Processing and Preservation Laboratory
42	C307	U20HS501	Professional Communication
43	C308	U20FT601	Baking and Confectionary Technology
44	C309	U20FT602	Fruits and Vegetable Processing Technology
45	C310	U20FT622	Nutraceutical and Functional Foods
46	C311	U20FT634	Separation Techniques in Food Processing
47	C312	U20FT643	Food Quality Assurance and Control
48	C313	U20FT753	Post Harvest Technology
49	C314	U20FT603	Baking and Confectionary Technology Laboratory
50	C315	U20FT604	Fruits and Vegetable Processing Technology Laboratory
51	C401	U20FT701	Dairy Technology
52	C402	U20FT702	Food Packaging Technology
53	C403	U20GE801	Professional Ethics in Engineering
54	C404	U20FT764	Technology of Fats and Oils
55	C405	U20FT873	Food Industrial Waste Management
56	C406	U20FT703	Dairy Technology Laboratory
57	C407	U20FT704	Testing of Packaging Materials Laboratory
58	C408	U20FT801	Project Work

SEMESTER-I

U20HS101 (C101) COMMUNICATIVE ENGLISH

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C101.1	Speak clearly, effortlessly, confidently and appropriately. (K2)
C101.2	Write coherently with acceptable accuracy, organizing ideas logically. (K2)
C101.3	Listen and comprehend different discourses and genres of texts. (K2)
C101.4	Read and comprehend different discourses and genres of texts. (K2)
C101.5	Read and infer, analyze, predict, interpret and draw conclusions any printed text. (K2)

U20MA101 (C102) ENGINEERING MATHEMATICS

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C102.1	Express large amounts of data and functions in an organized and concise form apart from diagonalizing matrices.(K4)
C102.2	Solve maxima and minima problems using differentiation. (K2)
C102.3	Apply functions of several variables to solve problems in engineering and technology. (K2)
C102.4	Evaluate integrals by using Fundamental Theorem of Calculus. (K2)
C102.5	Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change the order and change of variables. (K2)

U20PH101 (C103) ENGINEERING PHYSICS - I

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C103.1	Assess the elastic behavior of the materials and bending behavior of beam. (K2)
C103.2	Acquire knowledge of NDT and applications of ultrasonics. (K2)
C103.3	Know the development of modern physics and its applications.. (K2)
C103.4	Recognize the uses of laser and fiber optics. (K2)
C103.5	Distinguish the different crystal systems, structural determination and synthesis of crystals. (K2)

U20CY101 (C104) ENGINEERING CHEMISTRY

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C104.1	Describe the General Structure of Polymers. Identify and Explain differences between Addition and Stepwise Polymerization. (K2)
C104.2	Explain how selected Isomers could be used for measurement of Surface Area of Materials or in Rationalization of Catalysis. (K2)
C104.3	Derive and discuss the First and Second Laws of Thermodynamics. (K3)
C104.4	Making possible to apply this knowledge in different areas, other than Photo Chemistry and Spectroscopy. (K2)
C104.5	Illustrate the Phase Transition of One Component and Two Component system and Types of Alloys and their applications in industries. (K2)

U20GE101 (C105) C PROGRAMMING

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C105.1	Develop simple applications in C using basic constructs. (K3)
C105.2	Design and implement applications using arrays and strings. (K3)
C105.3	Develop and implement applications in C using functions and pointers. (K3)
C105.4	Develop applications in C using structures. (K2)
C105.5	Design applications using sequential and random-access file processing. (K2)

U20GE102 (C106) ENGINEERING GRAPHICS

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C106.1	Familiarize with the fundamentals and standards of Engineering graphics. (K2)
C106.2	Perform freehand sketching of basic geometrical constructions and multiple views of objects. (K1)
C106.3	Project orthographic projections of lines and plane surfaces. (K3)
C106.4	Draw projections and solids and development of surfaces. (K3)
C106.5	Visualize and to project isometric and perspective sections of simple solids. (K1)

U20BS101 (C107) PHYSICS AND CHEMISTRY LABORATORY

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C107.1	Assess optical fibre parameters using laser properties. (K2)
C107.2	Measure the velocity of ultrasonic waves in a given liquid medium. (K2)
C107.3	Compute the wavelength of mercury spectrum using properties of light. (K2)
C107.4	The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters. (K2)
C107.5	Utilize the fundamental laboratory techniques for analyses such as titrations, separation, purification and spectroscopy. (K2)

U20GE103 (C108) C PROGRAMMING LABORATORY

COURSE OUTCOMES:

Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C108.1	Implement basic input/output operations using appropriate statements. .(K3)
C108.2	Develop a program to determine leap years based on specified conditions. .(K3)
C108.3	Utilize appropriate functions and control flow to perform specified operations. .(K2)
C108.4	Apply mathematical operations and conditional statements to validate Armstrong numbers. .(K3)
C108.5	Create functions to convert decimal numbers into binary, octal, and hexadecimal formats. .(K2)
C108.6	Design a program to sort a list of numbers using pass by reference. .(K3)

SEMESTER: II

U20HS201 (C109) FUNCTIONAL ENGLISH

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
109.1	Use academic and technical vocabulary in relevant contexts. Construct meaningful and grammatically correct sentence. (K2)
109.2	Effectively listen and acquire language and content, read fast and understand texts. (K3)
109.3	Use oral presentation skills in all professional contexts. (K3)
109.4	Demonstrate the understanding of the nature and importance of technical communication Draft various types of technical and business documents like, reports, proposals and business letters. (K2)
109.5	Compose documents like job application, book review etc. (K2)

U20MA201 (C110) ADVANCED CALCULUS AND ORDINARY DIFFERENTIAL EQUATIONS

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C110.1	Evaluate the effective mathematical tools to obtain the solutions of first and second order differential equations that model physical processes. (K3)
C110.2	Express Gradient, divergence and curl of a vector point function and related identities. Evaluation of line, surface and volume integrals using Gauss, Stokes and Green's theorems and their verification. (K2)
C110.3	Apply the tools of differentiation and integration of functions of a complex variable that are used in various techniques dealing engineering problems. (K3)
C110.4	Express Analytic functions, conformal mapping and complex integration. (K2)
C110.5	Solve Laplace transform and inverse transform of simple functions, properties, various related theorems and application to solve the differential equations with constant coefficients. (K2)

U20PH201 (C111) ENGINEERING PHYSICS - II

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C111.1	Select the metals required for specific applications in the area of engineering and technology. (K2)
C111.2	Distinguish between different types of semiconductor and determination of Hall co-efficient. (K2)
C111.3	Understand the property of dielectric and ferro electric property of materials. (K2)
C111.4	Identify different magnetic materials and super conducting materials. (K3)
C111.5	Understand the idea used in new technologies. (K2)

U20GE201 (C112) PYTHON PROGRAMMING

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C112.1	Develop algorithmic solutions to simple computational problems. (K3)
C112.2	Decompose a Python program into functions. (K2)
C112.3	Implement database and GUI applications. (K3)
C112.4	Represent compound data using Python lists, tuples, dictionaries. (K2)
C112.5	Read and write data from/to files in Python Programs. (K2)

U20FT201 (C113) FUNDAMENTALS OF BIO CHEMISTRY

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C113.1	Explain the Fundamentals of Water and Electrolytes. (K3)
C113.2	Elucidate the structure and Properties of Carbohydrates. (K3)
C113.3	Rewrite the structure and Properties of Lipids (K2)
C113.4	Infer the structure of Nucleic Acids (K2)
C113.5	Recognize the structural and Functional Role of Proteins. (K2)

U20FT202 (C114) MICROBIOLOGY

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C114.1	Acquire knowledge on historical developments in microbiology. (K2)
C114.2	Classify and identify the structure of microorganisms (K2)
C114.3	Interpret the different types of microscopes and staining techniques. (K2)
C114.4	Formulate media for microbial growth. (K2)
C114.5	Identify the technique used for isolation and control of microorganisms. (K2)

U20GE203 (C115) ENGINEERING PRACTICES LABORATORY

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C115.1	Identify Tools and Techniques used for Sheet Metal Fabrication. (K1)
C115.2	Use welding equipment to join the structures. (K3)
C115.3	Demonstrate Plumbing requirements of domestic buildings. (K3)
C115.4	Apply the skills of basic electrical engineering for house wiring practice.(K3)
C115.5	Measure various electrical quantities. (K3)
C115.6	Explain the working of electronic components and its utilization. (K2)

U20GE204 (C116) PYTHON PROGRAMMING LABORATORY

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C116.1	Compile and execute simple Python programs. (K2)
C116.2	Implement mathematical calculation in programs. (K2)
C116.3	Develop Python programs step-wise by defining functions and calling them. (K2)
C116.4	Use Python lists, tuples, dictionaries for representing compound data. (K2)
C116.5	Execute simulation of psgame programs. (K2)

U20FT203 (C117) FUNDAMENTALS OF BIO CHEMISTRY LABORATORY

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C117.1	Understand the Biochemistry laboratory functional components.(K2)
C117.2	Understand the basics principle of preparation of buffers. (K2)
C117.3	Have a sound knowledge of qualitative and quantitative test of different biomolecules. (K3)
C117.4	Understand the basics knowledge of Biochemical parameter and their nutrition properties of different food samples. (K2)
C117.5	Have a sound knowledge of different separation techniques of proteins. (K3)

SEMESTER: III

U20MA301 (C201) TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C201.1	Understand how to solve the given standard partial differential equations. (K3)
C201.2	Solve differential equations using Fourier series analysis which plays a vital role in engineering applications. (K3)
C201.3	Appreciate the physical significance of Fourier series techniques in solving one- and two-dimensional heat flow problems and one-dimensional wave equations. (K3)
C201.4	Understand the mathematical principles on transforms and partial differential equations would provide them the ability to formulate and solve some of the physical problems of engineering. (K4)
C201.5	Use the effective mathematical tools for the solutions of partial differential equations by using Z-transform techniques for discrete time systems. (K3)

U20FT301 (C202) FOOD PROCESS CALCULATIONS

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C202.1	Apply different systems of units and dimensions, estimate compositions of mixtures and solutions. (K2)
C202.2	Apply material balance for different unit operations (K2)
C202.3	Apply material balance for recycle operations and perform humidification calculations. (K2)
C202.4	Perform energy balance calculations. (K3)
C202.5	Determine the GHV, NHV and composition of fuels. (K2)

U20FT302 (C203) UNIT OPERATIONS IN FOOD PROCESSING

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C203.1	Understand the principles of separation methods used in the process industry. to appreciate different equipment's developed for separation.(K2)
C203.2	Develop the various separations methods techniques. (K3)
C203.3	Understand the knowledge of size reduction in food processing units. (K3)
C203.4	Able to explain about the equilibrium separation methods. (K2)
C203.5	Design the crystallizers and distillation equipments. (K3)

U20FT303 (C204) FOOD SCIENCE AND NUTRITION

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C204.1	Interpret the physiological and metabolic functions of nutrients. (K3)
C204.2	Select appropriate carbohydrate diet based on their health effects. (K3)
C204.3	Recommend the intake of lipids and proteins based on their nutritional value. (K2)
C204.4	Assess energy balance and body composition. (K2)
C204.5	Identify nutrition requirement based on different age groups. (K2)

U20FT304 (C205) FLUID MECHANICS

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C205.1	Classify fluids, apply hydrostatic equilibrium and dimensional analysis in fluid flow behaviour. (K2)
C205.2	Derive and apply basic equations of fluid flow. (K2)
C205.3	Analyze fluid flow through porous media and select suitable mixing equipment used in food industries. (K3)
C205.4	Select and evaluate the performance of pumps. (K2)
C205.5	Illustrate the principle and application of different flow measuring devices and valves. (K2)

U20FT305 (206) THERMODYNAMICS

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C206.1	Outline the basic concepts and apply the first law of thermodynamics in selected processes (K2)
C206.2	Understand the principle of second law of thermodynamics and concepts of Carnot cycle. (K2)
C206.3	Interpret the second law of thermodynamics and relate the properties of pure substance. (K3)
C206.4	Estimate the properties of steam and measurement of quality of steam using calorimeters. (K3)
C206.5	Integrate the use of simple calculation in gaining the working knowledge of different boilers. (K3)

U20FT306 (C207) UNIT OPERATIONS LABORATORY

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C207.1	Demonstrate the basic principles of chemical engineering and its applications. (K2)
C207.2	Apply the skill of material balance and energy balance in unit operations unit process. (K3)
C207.3	To develop knowledge on the basic principles of chemical engineering and its applications. (K2)
C207.4	Be able to apply the skill of material balance in unit operations unit process. (K2)
C207.5	Be able to apply the skill energy balance in unit operations unit process. (K2)

U20FT307 (C208) FOOD SCIENCE AND NUTRITION LABORATORY

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C208.1	Explain the physical and chemical properties of food. (K2)
C208.2	Familiarize in precipitation of casein and gellation of starch.. (K2)
C208.3	Understand the food groups and constituents of food. (K2)
C208.4	Understand the energy from food. (K2)
C208.5	Do the nutritional assessment, food constituents and their daily dietary allowances. (K2)

U20HS301 (C209) INTERPERSONAL SKILLS/LISTENING AND SPEAKING

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C208.1	Listen and respond appropriately. (K2)
C208.2	Participate in group discussions. (K2)
C208.3	Make effective presentations. (K2)
C208.4	Participate confidently and appropriately in conversations formal. (K2)
C208.5	Participate confidently and appropriately in conversations informal. (K2)

SEMESTER: IV

U20MA403 (C210) PROBABILITY AND STATISTICS

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C210.1	Understand the fundamental knowledge of the concepts of probability and have knowledge of standard distributions which can describe real life phenomenon. (K3)
C210.2	Understand the basic concepts of one- and two-dimensional random variables and apply in engineering applications. (K2)
C210.3	Apply the concept of testing of hypothesis for small and large samples in real life problems. (K2)
C210.4	Apply the basic concepts of classifications of design of experiments in the field of agriculture and statistical quality control. (K2)
C210.5	Have the notion of sampling distributions and statistical techniques used in engineering and management problems. (K3)

U20HS202 (C211) ENVIRONMENTAL SCIENCE AND ENGINEERING

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C211.1	Understand the environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course. (K2)
C211.2	Create public awareness of environment at infant stage. (K2)
C211.3	Understand the ignorance and incomplete knowledge has lead to misconceptions. (K3)
C211.4	Development and improvement in standard of living has lead to serious environmental disasters. (K2)
C211.5	Know about the knowledge of the social issues and its environment. (K2)

U20FT401 (C212) FUNDAMENTALS OF HEAT AND MASS TRANSFER

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C212.1	Infer the fundamental concept of heat conduction. (K1)
C212.2	Make use of dimensional analysis for solving convective heat transfer coefficient. (K2)
C212.3	Select a suitable heat exchanger and analyze the performance. (K3)
C212.4	Apply the concepts of radiation in solving heat transfer problems. (K3)
C212.5	Apply the concepts of mass transfer in solving mass transfer problems. (K4)

U20FT402 (C213) FOOD MICROBIOLOGY

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C213.1	Recognize the sources and factors influencing the microbial growth. (K2)
C213.2	Identify the techniques used to assess the microbial load. (K2)
C213.3	Apply the knowledge of microorganisms in fermentation process. (K2)
C213.4	Interpret microbial spoilage of different foods. (K2)
C213.5	Distinguish food borne diseases and intoxication caused by microorganisms. (K2)

U20FT403 (C214) FOOD CHEMISTRY

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C214.1	Interpret the nutritional importance of foods and water. (K2)
C214.2	Summarize the nutritional importance of vitamins and minerals. (K2)
C214.3	Recognize the changes in food components during cooking, processing and storage (K2)
C214.4	Modify the carbohydrates, proteins and fats based on its functional properties. (K2)
C214.5	Apply the different methods of food preservation. (K2)

U20FT404 (C215) PROPERTIES OF FOOD MATERIALS

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C215.1	Interpret the physical properties of agricultural materials. (K2)
C215.2	Elaborate the thermal properties and its application. (K4)
C215.3	Outline the optical and electromagnetic properties. (K2)
C215.4	Recognize the rheological properties of food materials. (K2)
C215.5	Infer textural properties and color measurements of food materials. (K4)

U20FT406 (C216) HEAT AND MASS TRANSFER LABORATORY

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C216.1	Conduct experiments to measure thermal conductivity using different apparatus. (K2)
C216.2	Perform experiments to determine the thermal conductivity of composite materials and insulating powders. (K2)
C216.3	Measure the Stefan-Boltzmann constant and determine the emissivity of a grey surface. (K2)
C216.4	Determine the Coefficient of Performance (COP) of a refrigeration system. (K3)
C216.5	Perform performance tests on reciprocating air compressors and refrigeration systems. (K3)

U20FT406 (C217) FOODMICROBIOLOGYLABORATORY

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C217.1	To understand the methods of isolating and characterizing various microbes associated with foods and food groups. (K3)
C217.2	To understand and use various microbiological techniques for the study of foods. (K3)
C217.3	To understand the methods used to detect pathogens in foods. (K2)

U20HS401 (C218) ADVANCED READING AND WRITING

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C218.1	Write different types of essays. (K3)
C218.2	Write winning job applications. (K3)
C218.3	Read and evaluate texts critically. (K2)
C218.4	Display critical thinking in various professional contexts. (K2)

SEMESTER: V

U20FT501 (C301) FOOD ANALYSIS

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C301.1	Understand the principles behind analytical techniques in food analysis. (K3)
C301.2	Explain the methods of selecting appropriate techniques in the analysis of food products. (K2)
C301.3	Explain the role of food analysis in food standards and regulations for the manufacture and the sale of food products and food quality control in food industries. (K3)
C301.4	Demonstrate about the chromatographic techniques-HPLC, GC. (K3)
C301.5	Apply the current state of knowledge in food analysis. (K3)

U20FT502 (C302) REFRIGERATION AND COLD CHAIN MANAGEMENT

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C302.1	Interpret the basics of refrigeration with thermodynamic principles and Carnot cycle. (K1)
C302.2	Make use of the concept of refrigeration cycles. (K3)
C302.3	Identify various components of refrigeration system and its types. (K2)
C302.4	Adapt low temperature storage systems for foods. (K3)
C302.5	Apply cold chain and refrigeration for food products. (K3)

U20FT503 (C303) FOOD PROCESSING AND PRESERVATION

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C303.1	Understand the principles of food processing and preservation. (K3)
C303.2	Explain the role of different methods the processing of different foods and their impact on the shelf life, quality, and other physical and sensory characteristics of foods. (K3)
C303.3	Illustrate the recent methods of minimal processing of foods to understand the materials and types of packaging for foods. (K2)
C303.4	Explain the recent methods of different preservatives and preservation. (K2)
C303.5	Apply the principles of food packaging and considerations. (K3)

U20FT512 (C304) FERMENTATION TECHNOLOGY

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C304.1	Apply the principles of microbiology in the production of fermented foods (K3)
C304.2	Classify fermentation process and maintain aseptic conditions in a fermentation process. (K2)
C304.3	Relate the process parameters in aeration and agitation of a fermentation operation. (K2)
C304.4	Make use of concepts of fermentation in dairy, meat, cereal and beverage products. (K2)
C304.5	Identify processes involved in production of various fermented products. (K2)

U20FT504 (C305) FOOD ANALYSIS LABORATORY

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C305.1	Analyze the foods and food products for chemical components. Knowing standards for food products. (K2)
C305.2	Obtain knowledge of adulterants in foods. (K2)

U20FT505 (C306) FOOD PROCESSING AND PRESERVATION LABORATORY

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C306.1	Select the specific preservation technology suitable for a specific food. (K1)
C306.2	Classify the different categories of food. (K2)

U20HS501 (C307) PROFESSIONAL COMMUNICATION

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C307.1	Make effective presentations. (K2)
C307.2	Participate confidently in Group Discussions. (K2)
C307.3	Attend job interviews and be successful in them. (K4)
C307.4	Develop adequate Soft Skills required for the workplace. (K4)

SEMESTER: VI

U20FT601 (C308) BAKING AND CONFECTIONERY TECHNOLOGY

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C308.1	Choose the ingredients for production of bakery products. (K2)
C308.2	Select appropriate equipments for baking process. (K2)
C308.3	Adapt bread making process and identify defects in bread. (K2)
C308.4	Formulate various bakery products. (K3)
C308.5	Develop confectionery products and identify cause for defects. (K3)

U20FT602 (C309) FRUITS AND VEGETABLES PROCESSING TECHNOLOGY

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to explain:</i>
C309.1	Interpret physiological development of fruit and deterioration factors (K2)
C309.2	Identify different preprocessing methods, preservation and storage. (K2)
C309.3	Select the suitable processing methods for fruits and vegetables. (K2)
C309.4	Elaborate the techniques involved in processing of specialty products. (K2)
C309.5	Perform canning operations and utilize fruits /vegetable waste. (K2)

U20FT622 (C310) NUTRACEUTICAL AND FUNCTIONAL FOODS

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C310.1	Explain the basic concepts of Nutraceuticals and functional food, their chemical nature and methods of extraction. (K2)
C310.2	Understand the role of Nutraceuticals and functional food in health and disease. (K3)
C310.3	analyze and develop the functional product of nutraceuticals. (K2)
C310.4	Apply and develop of the Nutraceuticals and Functional foods for some disease . (K2)
C310.5	Asses the antioxidant activity .(K3)

U20FT634 (C311) SEPARATION TECHNIQUES IN FOOD PROCESSING

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C311.1	Infer the concepts of separation and filtration techniques(K3)
C311.2	Select suitable membrane process and cleaning techniques (K3)
C311.3	Classify and adapt appropriate adsorption techniques. (K3)
C311.4	Apply the concepts of ionic separation and permeation. (K3)
C311.5	Elaborate other separation processes and effluent treatment. (K3)

U20FT643 (C312) FOOD QUALITY ASSURANCE AND CONTROL

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C312.1	Identify suitable food quality standards (K2)
C312.2	Apply principles of quality assurance and quality management systems in food industries. (K4)
C312.3	Appraise various regulations for food business operator. (K2)
C312.4	Adapt and interpret sampling and statistical quality control techniques. (K2)
C312.5	Take part in sensory analysis of foods. (K2)

U20FT753 (C313) POSTHARVEST TECHNOLOGY

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C313.1	Apply the post-harvest engineering to prevent loss. (K2)
C313.2	Infer the different cleaning, threshing and grading operations involved in food industry. Utilize the conveyors in the food industry. (K2)
C313.3	Apply the storage principles in extending the shelf-life of commodity. (K2)
C313.4	A Identify the primary and secondary microorganisms of stored food grains. (K4)
C313.5	Identify the suitable pest control and management method for agricultural produce. (K4)

U20FT603 (C314) BAKING AND CONFECTIONERY TECHNOLOGY LABORATORY

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C314.1	Prepare the various bakery products and perform quality analysis for the same.(K4)

U20FT604 (C315) FRUITS AND VEGETABLE PROCESSING TECHNOLOGY LABORATORY

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C315.1	Explain the fruit and vegetable process technology. (K2)

SEMESTER: VII

U20FT701 (C401) DAIRY TECHNOLOGY

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C401.1	Identify the physico-chemical properties of milk. (K2)
C401.2	Apply the acquired knowledge on raw milk collection, transportation and reception. (K3)
C401.3	Infer the technical aspects of fluid milk processing and production of milk products. (K3)
C401.4	Select and design appropriate dairy processing equipments. (K3)
C401.5	Choose suitable cleaning operations in dairy industry. (K3)

U20FT702 (C402) FOOD PACKAGING TECHNOLOGY

Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C402.1	Apply the concept of size reduction. (K2)
C402.2	Choose mechanical separation techniques for food processing. (K2)
C402.3	Elaborate the crystallization process and its equipments. (K2)
C402.4	Analyze the mixing process and demonstrate the mixing equipments. (K2)
C402.5	Outline the extrusion process and material handling systems. (K2)

U20GE801 (C403) PROFESSIONAL ETHICS IN ENGINEERING

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C403.1	Apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society. (K2)
C403.2	Understand the basic perception of profession, professional ethics, various moral & social issues, industrial standards, code of ethics and role of professional ethics in engineering field. (K3)
C403.3	Aware of professional rights and responsibilities of an engineer, responsibilities of an engineer for safety and risk benefit analysis. (K3)
C403.4	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. (K2)
C403.5	Understand the role of professional bodies. (K1)

U20FT764 (C404) TECHNOLOGY OF FATS AND OILS

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C404.1	Assess the physical and chemical properties of fats and oils.. (K2)
C404.2	Recommend suitable mechanical methods for oil extraction. (K2)
C404.3	Apply solvent extraction and refining of oils. (K1)
C404.4	Develop edible oil, fat products and modified oil. (K2)
C404.5	Choose an appropriate package and storage for oils. (K1)

U20FT873 (C405) FOOD INDUSTRIAL WASTE MANAGEMENT

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C405.1	Classify food waste and recommend the strategies for waste minimization. (K2)
C405.2	Identify the method for treatment of liquid and solid waste. (K2)
C405.3	Utilize residues from oil seed and tuber processing industries. (K3)
C405.4	Elaborate by-product production from animal product-based industries. (K3)
C405.5	Develop by-products from grain, fruits and vegetables processing. (K4)

U20FT703 (C406) DAIRY TECHNOLOGY LABORATORY

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C406.1	Demonstrate the dairy process technology. (K3)

U20FT704 (C407) TESTING OF PACKAGING MATERIALS LABORATORY

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C407.1	Get experience on testing food packaging materials to assure quality of foods. (K2)

SEMESTER: VIII

U20FT801 (C408) PROJECT WORK

COURSE OUTCOMES:	
Course Code	Course Outcomes
	<i>Upon completion of the course, the students will be able to:</i>
C408.1	Take up any challenging practical problems and find solution by formulating proper methodology (K3)
C408.2	Apply the acquired technical knowledge and skills to solve real time problems. (K2)
C408.3	Design and fabricate food processing equipments. (K2)
C408.4	Formulate and develop value added food products. (K1)
C408.5	Apply scientific research tools for design and optimization of food processing operations. (K2)
C408.6	Apply various depreciation methods to evaluate public alternatives.(K2)