Anekant Education Society's

Tuljaram Chaturchand College, Baramati

(Autonomous)

Three Year B.Voc Degree Program in Food Technology & Research

(Faculty of Food Technology & Research)

SY B.Voc (Food Technology) Semester –**IV**

For Department Food Technology & Research

Tuljaram Chaturchand College, Baramati

To be implemented from Academic Year 2019-2020

Title of the Programme: SY B.Voc (Food Technology & Research)

Anekant Education Society's
TULJARAM CHATURCHAND COLLEGE, BARAMATI
DIST-Pune-413102
Autonomous

First Year: Semester-I

Subj. Code	Subject Name	No. of Credits	Marks
Theory (General Component)			
FP-1	Principles of Food Preservation	4	100
FP-2	Food Microbiology - I	4	100
FP-3	Food Science - I	4	100
Practical (Skill Component)			
FP-1.1	Principles of Food Preservation	6	150
FP-1.2	Computer Application	6	150
FP-1.3	Food Science-I	6	150

First Year: Semester-II

Subj. Code	Subject Name	No. of Credits	Marks
Theory (General Component)			
FP-4	Nutrition Science	4	100
FP-5	Food Microbiology-II	4	100
FP-6	Food Science - II	4	100
Practical (Skill Component)			
FP-2.1	Nutrition Science	6	150
FP-2.2	Food Microbiology-II	6	150
FP-2.3	Soft Skill Development	6	150

Second Year: Semester-III

Subj. Code	Subject Name	No. of Credits	Marks
Theory (General Component)			
FP-7	Processing of Fruits, Vegetables & Plantation Crops	4	100
FP-8	Food Analytical Techniques	4	100
FP-9	Food Chemistry-I	4	100
Practical (Skill Component)			
FP-3.1	Processing of Fruits, Vegetables & Plantation crops	6	150
FP-3.2	Food Analytical Techniques	6	150
FP-3.3	Fundamentals in Bio-Statistics	6	150

Second Year: Semester-IV

Subj. Code	Subject Name	No. of Credits	Marks
Theory (General Component)			
FP-10	Processing of Cereal, Pulses and Oilseeds	4	100
FP-11	Bakery and Confectionery Technology	4	100
FP-12	Food Chemistry-II	4	100

Practical (Skill Component)			
FP-4.1	Processing of Cereal, Pulses and Oilseeds	6	150
FP-4.2	Bakery and Confectionary Technology	6	150
FP-4.3	Food Chemistry -II	6	150

Third Year: Semester-V

Subj. Code	**Subject Name**	**No. of Credits**	**Marks**
Theory (General Component)			
FP-13	Dairy Technology	4	100
FP-14	Food Quality and Safety Management	4	100
FP-15	Principle of Post-Harvest Technology	4	100
Practical (Skill Component)			
FP-5.1	Dairy Technology	6	150
FP-5.2	Entrepreneurship Development	6	150
FP-5.3	Project	6	150

Third Year: Semester-VI

Subj. Code	**Subject Name**	**No. of Credits**	**Marks**
Theory (General Component)			
FP-16	Animal Product Technology	4	100
FP-17	Food Safety, Hygiene & Sanitation	4	100
FP-18	Packaging Technology	4	100
Practical (Skill Component)			
FP-6.1	Animal Product Technology	6	150
FP-6.2	Packaging Technology	6	150
FP-6.3	Internship	6	150

Title of the Course: B. Voc. (Food Processing & Post Harvest Technology)
(To be implemented from Academic Year - 2019-2020)

Course structure:

- B. Voc. is three year degree programme with three theory and three practical courses in each semester**.**
- Each theory course will be of four credits and each credit is of 15 periods
- Each practical course will be of six credits and each credit is of 15 periods
- Each period is of one clock hour.
- In each practical course, there will be one visit to the relevant industry/ institute.
- In addition to the regular practicals based on the theory course, special emphasis will be on communications and soft skills development of the students.

Eligibility:

1) **First Year B.Voc. (Diploma):** A student who has passed the Higher Secondary School Certificate (10+2) in any stream or its equivalent examination
2) **Second Year B.Voc. (Advanced diploma):** Keeping terms of First Year of B. Voc. and if they fulfill the eligibility conditions.
3) **Third Year B.Voc. (Degree):** Student shall pass all First Year B. Voc. courses and satisfactorily keeping terms of Second Year of B. Voc.

Note: Admissions will be given as per the selection procedure / policies adopted by the college, in accordance with conditions laid down by the Savitribai Phule Pune University, Pune.

Examination Pattern:

Examination:

- **Pattern of Examination**.
  i) Internal exam, Term end exam, Oral, Project, Presentation, GD, Viva voce
  ii) Pattern of the question paper:
    i) 25% Objective Question
    ii) 50% Short and Long Answer type question
    iii) 25% Problem based Case Study/long answer type
- **Theory Examination: -**
  i) Continuous Internal Assessment: 50 Marks (Unit Test I & II, Assignment-2No., Attendance) for each course of programme.
  ii) Semester End Examination: 50 Marks on the basis of Answer Sheet Evaluation for each course
- **Practical Examination: -**
  i) Continuous Internal Assessment: 75 Marks (Written exams, Visit Report, Journal, Viva Voce, Seminar/Presentation, Group Discussion and Attendance) for each course.
  ii) Semester End Examination: 75 Marks on the basis of Answer Sheet Evaluation with performance in practical examination which will be evaluated by external examiner for each course.

Programme Specific Outcomes (PSOs)

Second Year		Semester IV
PO-1	**Disciplinary Knowledge**	Understandthebasicconcepts,fundamentalprinciplesandexperimental findingsandthescientifictheoriesrelatedtofoodtechnology,foodscienceand foodtechnology&engineeringanditsotherfieldsrelatedtothe program.
PO-2	**Communication Skills**	Developvariouscommunicationskillssuchasreading,listeningandspeaking skills to express ideas and views clearly and effectively.
PO-3	**Critical Thinking**	Proposenovelideasinexplainingthescientificdata,factsandfiguresrelatedto scienceandtechnology.
PO-4	**Analytical Reasoningand Problem Solving**	Toenable the studentswithgoodscientific andengineeringknowledge soasto comprehend,design,andcreatefoodproductsanddevicesforthefoodindustry and provide solutions for the challenges in the food industry as well as in agriculture.
PO-5	**Senseof Inquiry**	Curiously ask relevant questions for better understanding of fundamental conceptsandprinciples,scientifictheoriesandapplicationsrelatedtothestudy.
PO-6	**UseofModern Tools**	Operatemoderntools,equipment,instrumentsandlaboratorytechniquesto perform the experiments and write the programs in different languages.
PO-7	**Research Skills**	Understand how to design, collect, analyze, interpret and evaluate information/data that is relevant to food technology.
PO-8	**Applicationof Knowledge**	Developascientificoutlookandapplytheknowledgewithrespecttofood technology.
PO-9	**Ethical Awareness**	Totrainstudentsinprofessionalandethicalattitude,effectivecommunication skills, teamworkskillsandmultidisciplinaryapproachesrelatedtofoodtechnology and engineering.
PO-10	**Teamwork**	Understandthebasicconcepts,fundamentalprinciplesandexperimental findings and the scientific theories related to food technology, food science and food technology & engineering and its other fields related to the program.
PO-11	**Environmentand Sustainability**	Developvariouscommunicationskillssuchasreading,listeningandspeaking skills to express ideas and views clearly and effectively.
PO-12	**LifelongLearning**	Propose novel ideas in explaining the scientific data, facts and figures related to science and technology.

Processing of Cereals, Pulses and Oilseeds

Theory **Paper No. FP-10**

Maximum Marks: 100 **Credits: 4**

Teaching Period: 4 Theory **Teaching Load: 60 Theory Period/Semester**

Learning Objectives:

- To teach technology of milling of various cereals
- To know about the structure and composition of various cereal, pulses & oil seeds
- To impart technical knowledge of pulses and oilseeds refining
- To develop the skills on the postharvest changes in plant based foods, their losses and to preserve food by suitable packaging
- To learn about nutritional value of cereal, pulses and oil seeds and their importance
- To learn extrusion method, various oil extraction methods and refining of oil

Course Outcome:

CO1: Students will have a thorough understanding of unit operations followed for raw form to an edible form of cereals and legumes

CO2: The students will know the importance of various methods to identify any disorder in fresh commodities.

CO3: Students will know about emerging technologies related toharvesting ofcereals, pulses and oil seeds

CO4: Students will learn different milling processes

CO5: Students will learn different processed products of cereals, pulses and oil seeds

CO6: Students will know about extrusion and various extrudes products

CO7: Students will know about importance of lipids, their extraction process and further processing

TOPIC-

Unit-1: Technology of cereals-I **14 Periods**

i. Wheat --Types, milling, flour grade, flour treatments (bleaching, maturing), flour for various purposes, technology of dough development.
ii. Rice – Physico-chemical properties, milling (mechanical & solvent extraction of rice bran), parboiling, ageing of rice, utilization of by products.
iii. Corn – Milling (wet & dry) , cornflakes

Unit-2: Technology of Cereals-II **12Periods**

i. Barley- Milling (pearl barley, barley flakes & flour), beer preparation, Oats – Milling (oatmeal, oat flour & oat flakes), Sorghum and millets – Traditional & commercial milling (dry & wet**)** Rye and triticale—milling (flour), uses, Anti-nutritional Factors in Cereals and their removal

Unit-3: Technology of Pulses: **12 Periods**

Milling of pulses- Dry milling, wet milling, improved milling method, woaking, roasting, steaming and cooking, germination, parching, Factors affecting cooking of legumes, Anti-nutritional Factors in Pulses and their removal

Unit-4: Technology of Oilseeds: **12 Periods**

Introduction, Extraction of oil and refining, Sources of protein (defatted flour, protein concentrates and isolates), properties and uses, protein texturization, fibre spinning, Oil extraction and refining, Processing of oils, Anti-nutritional Factors in Oilseeds and their removal

Unit-5: Breakfast cereals and Snack foods **10 Periods**

Introduction, history, present status, Processing of hot serve cereals and ready –to –eat breakfast cereals, Flakes, shreds, granules, puffed cereals, sugar coated products, popped and puffed snacks, factors affecting their quality, convenience cereal foods, Durum wheat products and extrusion cooking

References:

- Kent, Technology of Cereal, 5th Ed. Pergamon Press, 2003
- Chakraborty., Post Harvest Technology of Cereals, Pulses and Oilseeds, revised ed., Oxford & IBH Publishing Co. Pvt Ltd, 1988
- Marshall, Rice Science and Technology, Wadsworth Ed., Marcel Dekker, New York, 1994
- Mathews, R.H. Ed. 1989. Legumes: Chemistry and Technology and Human Nutrition, Marcel Dekker, New York
- Pomeranz, Y. Ed. 1978. Wheat: Chemistry and Technology. American Association Cereal chemist. St. Paul, Minnesota.
- Pomeranz, Y. 1987. Modern Cereal Science and Technology, VCH, New York
- Salunkhe, D.K., Kadam S.S. Ed. 1989. Handbook of World Food Legume: Chemistry, Processing and Utilization, CRC Press, Florida.
- Salunkhe, D.K., Kadam S.S. and Austin, A. Ed. 1986. Quality of Wheat and Wheat Production Metropolitan Book Co. New Delhi

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	4	-	1	-	3	-	1	2	-	4	-	1
CO2	3	2	1	-	2	-	-	4		3	2	1
CO3	3	2	-	2	3	-	-	-	-	3	2	-
CO4	-	-	-	6	-	5	3	-	-	-	-	-
CO5	2	2	1	-	-	2	5	-	-	2	2	1
CO6	2	2	-	4	-	-	1	-	-	2	2	-
CO7	-	-	1	-	-	-	-	-	-	-	-	1

Justification for the mapping

PO1:- Disciplinary Knowledge - Understand the basic concepts, fundamental principles and experimental findings and the scientific the ories related to food technology, food science and Food technology & engineering and its other fields related to the program.

CO1: Students will have a thorough understanding of unit operations followed for raw form to an edible form of cereals and legumes

CO2: The students will know the importance of various methods to identify any disorder in fresh commodities.

CO3: Students will know about emerging technologies related toharvesting ofcereals, pulses and oil seeds
CO5: Students will learn different processed products of cereals, pulses and oil seeds
CO6: Students will know about extrusion and various extrudes products

PO2:- Communication Skills:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.
CO2: The students will know the importance of various methods to identify any disorder in fresh commodities.
CO3: Students will know about emerging technologies related toharvesting ofcereals, pulses and oil seeds
CO5: Students will learn different processed products of cereals, pulses and oil seeds
CO6: Students will know about extrusion and various extrudes products

PO3- Critical Thinking :- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.
CO1: Students will have a thorough understanding of unit operations followed for raw form to an edible form of cereals and legumes
CO2: The students will know the importance of various methods to identify any disorder in fresh commodities.
CO5: Students will learn different processed products of cereals, pulses and oil seeds
CO7: Students will know about importance of lipids, their extraction process and further processing

PO4- Analytical Reasoning and Problem Solving- To enable the students with good scientific and engineering knowledge so as to comprehend, design, and create food products and devices for the food industry and provide solutions for the challenges in the food industry as well as in agriculture.
CO3: Students will know about emerging technologies related to harvesting of cereals, pulses and oil seeds
CO4: Students will learn different milling processes and their working
CO6: To know about extrusion and various extrudes products and their advantages.

PO5- Sense of Inquiry:- Curiously ask relevant questions for better understanding of fundamental concepts and principles, scientific theories and applications related to the study.
CO1: Students will have a thorough understanding of unit operations followed for raw form to an edible form of cereals and legumes
CO2: The students will know the importance of various methods to identify any disorder in fresh commodities.

CO3: Students will know about emerging technologies related to harvesting of cereals, pulses and oil seeds

PO6- Use of Modern Tools:-

Operatemoderntools,equipment,instrumentsandlaboratorytechniquesto perform the experiments and write the programs in different languages.

CO4: Students will learn different milling processes and their working

CO5: Students will learn different processed products of cereals, pulses and oil seeds

PO7- Research Skills:- Understand how to design, collect, analyze, interpret and evaluate information/data that is relevant to food technology.

CO1: Students will have a thorough understanding of unit operations followed for raw form to an edible form of cereals and legumes

CO4: Students will learn different milling processes and their working

CO5: Students will learn different processed products of cereals, pulses and oil seeds

CO1: Students will have a thorough understanding of unit operations followed for raw form to an edible form of cereals and legumes

PO8- Application of Knowledge:- Develop a scientific outlook and apply the knowledge with respect to food technology.

CO1: Students will have a thorough understanding of unit operations followed for raw form to an edible form of cereals and legumes

CO2: The students will know the importance of various methods to identify any disorder in fresh commodities.

PO9- Ethical Awareness- To train students in professional and ethical attitude, effective communication skills, team work skills and multidisciplinary approaches related to food technology and engineering.

PO10:- Team Work - Understand the basic concepts, fundamental principles and experimental findings and the scientific the ories related to food technology, food science and Food technology & engineering and its other fields related to the program.

CO1: Students will have a thorough understanding of unit operations followed for raw form to an edible form of cereals and legumes

CO2: The students will know the importance of various methods to identify any disorder in fresh commodities.

CO3: Students will know about emerging technologies related toharvesting ofcereals, pulses and oil seeds

CO5: Students will learn different processed products of cereals, pulses and oil seeds

CO6: Students will know about extrusion and various extrudes products

PO11:- Environment and Sustainability:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.

CO2: The students will know the importance of various methods to identify any disorder in fresh commodities.
CO3: Students will know about emerging technologies related toharvesting ofcereals, pulses and oil seeds
CO5: Students will learn different processed products of cereals, pulses and oil seeds
CO6: Students will know about extrusion and various extrudes products

PO12:- Lifelong Learning:- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.
CO1: Students will have a thorough understanding of unit operations followed for raw form to an edible form of cereals and legumes
CO2: The students will know the importance of various methods to identify any disorder in fresh commodities.
CO5: Students will learn different processed products of cereals, pulses and oil seeds
CO7: Students will know about importance of lipids, their extraction process and further processing

Second Year **Semester IV**

Processing of Cereals, Pulses and Oil Seeds

PRACTICAL **Paper No. FP-4.1**

Maximum Marks: 150 **Credits: 6**

Teaching Period: 2/weak **Teaching Load: 30 Practical/Semester (4 Period each)**

Learning Objectives:

- To teach technology of milling of various cereals
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- To impart technical knowledge of pulses and oilseeds refining
- To develop the skills on the postharvest changes in plant based foods, their losses and to preserve food by suitable packaging
- To learn about nutritional value of cereal, pulses and oil seeds and their importance
- To learn extrusion method, various oil extraction methods and refining of oil

Course Outcome:

CO1: Students will have a thorough understanding of unit operations followed for raw form to an edible form of cereals and legumes

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TOPIC

1)	Morphological Characteristics of cereals.	2P
2)	Physical properties of cereals.	1P
3)	To study the cooking quality of rice.	2P
4)	To study the dehulling of pulses	
5)	To study the process of flaking.	2P
6)	To study the process of puffing.	2P
7)	To study the parboiling of rice.	2P
8)	To study the malting of cereals	2P
9)	To study the cooking of dal	1P
10)	To study the spouting of pulses.	2P
11)	To study the preparation of soymilk and tofu	2P
12)	Production of protein rich product.	2P
13)	To study the preparation of extruded product i.e. noodles.	2P
14)	To study the mechanical extraction of oil	2P
15)	To study the procedure of food grade cake.	1P
16)	To study the preparation of instant dhokla.	1P
17)	Visit to industry	1P
18)	Preparation of visit report & presentation	2P

References:

- Kent, Technology of Cereal, 5th Ed. Pergamon Press, 2003
- Chakraborty., Post Harvest Technology of Cereals, Pulses and Oilseeds, revised ed., Oxford & IBH Publishing Co. Pvt Ltd, 1988
- Marshall, Rice Science and Technology, Wadsworth Ed., Marcel Dekker, New York, 1994
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CO1	4	-	1	-	3	-	1	2	-	4	-	1
CO2	3	2	1	-	2	-	-	4		3	2	1
CO3	3	2	-	2	3	-	-	-	-	3	2	-
CO4	-	-	-	6	-	5	3	-	-	-	-	-
CO5	2	2	1	-	-	2	5	-	-	2	2	1
CO6	2	2	-	4	-	-	1	-	-	2	2	-
CO7	-	-	1	-	-	-	-	-	-	-	-	1

Justification for the mapping

PO1:- Disciplinary Knowledge - Understand the basic concepts, fundamental principles and experimental findings and the scientific the ories related to food technology, food science and Food technology & engineering and its other fields related to the program.

CO1: Students will have a thorough understanding of unit operations followed for raw form to an edible form of cereals and legumes

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CO3: Students will know about emerging technologies related toharvesting ofcereals, pulses and oil seeds

CO5: Students will learn different processed products of cereals, pulses and oil seeds

CO6: Students will know about extrusion and various extrudes products

PO2:- Communication Skills:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.

CO2: The students will know the importance of various methods to identify any disorder in fresh commodities.

CO3: Students will know about emerging technologies related toharvesting ofcereals, pulses

and oil seeds

CO5: Students will learn different processed products of cereals, pulses and oil seeds

CO6: Students will know about extrusion and various extrudes products

PO3- Critical Thinking :- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.

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CO7: Students will know about importance of lipids, their extraction process and further processing

PO4- Analytical Reasoning and Problem Solving- To enable the students with good scientific and engineering knowledge so as to comprehend, design, and create food products and devices for the food industry and provide solutions for the challenges in the food industry as well as in agriculture.

CO3: Students will know about emerging technologies related to harvesting of cereals, pulses and oil seeds

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CO6: To know about extrusion and various extrudes products and their advantages.

PO5- Sense of Inquiry:- Curiously ask relevant questions for better understanding of fundamental concepts and principles, scientific theories and applications related to the study.

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PO6- Use of Modern Tools:-

Operatemoderntools,equipment,instrumentsandlaboratorytechniquesto perform the experiments and write the programs in different languages.

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PO7- Research Skills:- Understand how to design, collect, analyze, interpret and evaluate information/data that is relevant to food technology.

CO1: Students will have a thorough understanding of unit operations followed for raw form to an edible form of cereals and legumes
CO4: Students will learn different milling processes and their working
CO5: Students will learn different processed products of cereals, pulses and oil seeds
CO1: Students will have a thorough understanding of unit operations followed for raw form to an edible form of cereals and legumes

PO8- Application of Knowledge:- Develop a scientific outlook and apply the knowledge with respect to food technology.
CO1: Students will have a thorough understanding of unit operations followed for raw form to an edible form of cereals and legumes
CO2: The students will know the importance of various methods to identify any disorder in fresh commodities.

PO9- Ethical Awareness- To train students in professional and ethical attitude, effective communication skills, team work skills and multidisciplinary approaches related to food technology and engineering.

PO10:- Team Work - Understand the basic concepts, fundamental principles and experimental findings and the scientific the ories related to food technology, food science and Food technology & engineering and its other fields related to the program.

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CO5: Students will learn different processed products of cereals, pulses and oil seeds
CO6: Students will know about extrusion and various extrudes products

PO11:- Environment and Sustainability:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.
CO2: The students will know the importance of various methods to identify any disorder in fresh commodities.
CO3: Students will know about emerging technologies related toharvesting ofcereals, pulses and oil seeds
CO5: Students will learn different processed products of cereals, pulses and oil seeds
CO6: Students will know about extrusion and various extrudes products

PO12:- Lifelong Learning:- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.
CO1: Students will have a thorough understanding of unit operations followed for raw form to an edible form of cereals and legumes
CO2: The students will know the importance of various methods to identify any disorder in fresh commodities.

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Second Year **Semester IV**

Bakery and Confectionery Technology

Theory **Paper No. FP-11**

Maximum Marks: 100 **Credits: 4**

Teaching Period: 4 Theory **Teaching Load: 60 Theory Period/Semester**

Learning Objective:

- To know about role, chemistry, manufacturing of various ingredients and products in bakery and confectionery industry.
- To study the history of bakery & confectionary technology.
- To develop knowledge and skills in the preparation and storage of Bakery and Confectionery items
- To develop the skills on development of popular snack foods present in Indian Market.
- To learn about the different types of confectionary products.
- To know about the working of different bakery equipments in bakery industry.

Course Outcome:

CO1: Students will have a thorough understanding of processing and preservation of appetizers.

CO2: Students will have a thorough understanding on effect of blending and baking on final product of bakery.

CO3: The students will know the various extruded product development.

CO4: The students may plan to start their bakery and confectionery unit.

CO5: Students will know about the working of different bakery equipments in bakery industry.

CO6: Students may learn about the process of sugar & chocolate based confectionary products.

CO7: Students will know about manufacturing of various techniques in bakery and confectionery industry.

TOPIC

Unit-1: Wheat and bakery ingredients, Baking technology: 12 Periods

Varieties, Qualities, Types of wheat, Grading system, Chemical constituents, physiological and rheological properties, Enzymes in wheat flour, Major and minor ingredients and their functions in bakery products.

Unit-2: Bakery Products and Equipments 12 Periods

The reactions of baking (mixing, leavening, baking), preparation methods of bread, cake, biscuits, cookies, pastry, buns, crackers, types of quick bread, Non dairy creamer/toppings in bakery industries: Source, method of preparations. Bakery Organization and Equipment

Unit-3: Introduction to confectionery 12 Periods

History, traditional confectionery goods, types of confectionary, classification, invert sugar, glucose syrup, Manufacturing of food starches, heating of starch granules, gelatinization, retro gradation, factors affecting gelatinization.

Unit-4: Sugar based and chocolate based Confectionery 12 Periods

Manufacturing of raw, refined and White sugar, forms of sugar, liquid sweeteners, reactions of sugar, crystalline and amorphous confectionery

Chocolate based confectionery: History and development, cocoa processes, cocoa butter, emulsifiers used in chocolate confectionery coatings and cocoa, chocolate manufacture, chocolate bars and covered confectionery

Unit-5: Caramel, High boiled sweets, Toffee **12 Periods**

Definition, composition, caramel manufacture process, properties of high boiled sweets, preparation of high boiled sweets, types of toffee ingredient and their role, Fondant, Fudge preparation.

References:

1. Matz S. A. (1996): Bakery technology and engineering, 1st edition, Arya book depot New delhi.
2. Practical Baking Cooking, 1st edition, Queen street house, U.K.
3. Kamel B. S. and Stauffer C. E. (1993): Advances in baking technology, 1st edition, Blackie academic and professional.
4. Aylwaed F. (2001): Food Technology Processing and Quality control \, 1st edition, Agrobios (India)
5. Harry W, Loesecke (2001): Outlines of food technology, 2nd edition, Agribios (India)
6. Khetarpaul N, Grewal R. B. and Jood S. (2005): Bakery Science and Cereal Technology, 1st edition, Daya publishing house, Delhi.
7. Manay S.N. and Shadaksharaswamy M. (2001); Food facts and principles, 2nd edn, New Age International (P) limited publishers.
8. Minife B.W. (1997): Chocolate, cocoa and confectionery science and technology, 3rd edition, CBS Publishers and Distributors, New Delhi.

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	3	3	-	-
CO2	1	1	-	-	-	3	-	-	-	1	1	-
CO3	-	1	-	2	1	-	-	3	-	-	1	-
CO4	1	-	2	-	-	-	1	-	-	1	-	2
CO5	-	-	-	3	-	3	2	-	-	-	-	-
CO6	2	-	-	2	-	3	2	-	1	2	-	-
CO7	-	-	1	3	2	3	-	1	-	-	-	1

Justification for the mapping

PO1:- Disciplinary Knowledge - Understand the basic concepts, fundamental principles and experimental findings and the scientific the ories related to food technology, food science and Food technology & engineering and its other fields related to the program.

CO1: Students will have a thorough understanding on effect of blending and baking on final product of bakery.

CO2: Students will able to prepare different bakery products with different equipments.

CO4: The students may learn about the quality test of flour and what will be the effect of the flour quality on food.
CO6: Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.

PO2:- Communication Skills:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.
CO2: Students will able to prepare different bakery products with different equipments.
CO3: The students will be able to understand bakery and confectionery technology

PO3- Critical Thinking :- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.
CO4: The students may learn about the quality test of flour and what will be the effect of the flour quality on food.

PO4- Analytical Reasoning and Problem Solving- To enable the students with good scientific and engineering knowledge so as to comprehend, design, and create food products and devices for the food industry and provide solutions for the challenges in the food industry as well as in agriculture.
CO3: The students will be able to understand bakery and confectionery technology**.**
CO5: Students will know about the working of different bakery equipments in bakery industry.
CO6: Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.
CO7: Students will know about manufacturing of various techniques in bakery and confectionery industry.

PO5- Sense of Inquiry:- Curiously ask relevant questions for better understanding of fundamental concepts and principles, scientific theories and applications related to the study.
CO3: The students will be able to understand bakery and confectionery technology**.**
CO7: Students will know about manufacturing of various techniques in bakery and confectionery industry.

PO6- Use of Modern Tools:-
Operatemoderntools,equipment,instrumentsandlaboratorytechniquesto perform the experiments and write the programs in different languages.
CO2: Students will able to prepare different bakery products with different equipments.
CO5: Students will know about the working of different bakery equipments in bakery industry.
CO6: Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.
CO7: Students will know about manufacturing of various techniques in bakery and confectionery industry.

PO7- Research Skills:- Understand how to design, collect, analyze, interpret and evaluate information/data that is relevant to food technology.

CO4: The students may learn about the quality test of flour and what will be the effect of the flour quality on food.
CO5: Students will know about the working of different bakery equipments in bakery industry.
CO6: Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.

PO8- Application of Knowledge:- Develop a scientific outlook and apply the knowledge with respect to food technology.
CO3: The students will be able to understand bakery and confectionery technology**.**
CO7: Students will know about manufacturing of various techniques in bakery and confectionery industry.

PO9- Ethical Awareness- To train students in professional and ethical attitude, effective communication skills, team work skills and multidisciplinary approaches related to food technology and engineering.
CO1: Students will have a thorough understanding on effect of blending and baking on final product of bakery.
CO6: Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.

PO10:- Team Work - Understand the basic concepts, fundamental principles and experimental findings and the scientific the ories related to food technology, food science and Food technology & engineering and its other fields related to the program.

CO1: Students will have a thorough understanding on effect of blending and baking on final product of bakery.
CO2: Students will able to prepare different bakery products with different equipments.
CO4: The students may learn about the quality test of flour and what will be the effect of the flour quality on food.
CO6: Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.

PO11:- Environment and Sustainability:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.
CO2: Students will able to prepare different bakery products with different equipments.
CO3: The students will be able to understand bakery and confectionery technology

PO12:- Lifelong Learning:- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.
CO4: The students may learn about the quality test of flour and what will be the effect of the flour quality on food.

Second Year **Semester IV**

Bakery and Confectionary Technology

PRACTICAL **Paper No. FP-4.2**

Maximum Marks: 150 **Credits: 6**

Teaching Period: 2/weak **Teaching Load: 30 Practical/Semester (4 Period each)**

Learning Objective:

- To know about role, chemistry, manufacturing of various ingredients and products in bakery and confectionery industry.
- To study the history of bakery & confectionary technology.
- To develop knowledge and skills in the preparation and storage of Bakery and Confectionery items
- To develop the skills on development of popular snack foods present in Indian Market.
- To learn about the different types of confectionary products.
- To know about the working of different bakery equipments in bakery industry.

Course Outcome:

CO1: Students will have a thorough understanding of processing and preservation of appetizers.

CO2: Students will have a thorough understanding on effect of blending and baking on final product of bakery.

CO3: The students will know the various extruded product development.

CO4: The students may plan to start their bakery and confectionery unit.

CO5: Students will know about the working of different bakery equipments in bakery industry.

CO6: Students may learn about the process of sugar & chocolate based confectionary products.

CO7: Students will know about manufacturing of various techniques in bakery and confectionery industry.

TOPIC-

1.	Quality testing of flour and yeast	1P
2.	Preparation of cake	1P
3.	Preparation of black forest pastries	1P
4.	Preparation of cheese cake	2P
5.	Preparation of chocolate muffins	1P
6.	Preparation of Biscuits	1P
7.	Preparation of Ragi Biscuits	1P
8.	Preparation of cookies	1P
9.	Preparation of bread	2P
10.	Preparation of multigrain bread	2P
11.	Preparation of candy	1P
12.	Preparation of chocolate	2P
13.	Preparation of toffee	1P
14.	Preparation of fondant	1P
15.	Preparation of fudge	1P
16.	Preparation of chocolate mousse	1P

17. Preparation of Lava cake 1P
18. Preparation of Petha 2P
19. Preparation of Icing (Royal and Butter incing) 1P
20. Visit to Bakery Industry 1P
21. Visit to Confectionary Industry 1P
22. Preparation of report and Presentation (Bakery) 2P
23. Preparation of report and Presentation (Confectionery) 2P

References:

1. Matz S. A. (1996): Bakery technology and engineering, 1st edition, Arya book depot New delhi.
2. Practical Baking Cooking, 1st edition, Queen street house, U.K.
3. Kamel B. S. and Stauffer C. E. (1993): Advances in baking technology, 1st edition, Blackie academic and professional.
4. Aylwaed F. (2001): Food Technology Processing and Quality control \, 1st edition, Agrobios (India)
5. Harry W, Loesecke (2001): Outlines of food technology, 2nd edition, Agribios (India)
6. Khetarpaul N, Grewal R. B. and Jood S. (2005): Bakery Science and Cereal Technology, 1st edition, Daya publishing house, Delhi.
7. Manay S.N. and Shadaksharaswamy M. (2001); Food facts and principles, 2nd edn, New Age International (P) limited publishers.
8. Minife B.W. (1997): Chocolate, cocoa and confectionery science and technology, 3rd edition, CBS Publishers and Distributors, New Delhi.

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	3	3	-	-
CO2	1	1	-	-	-	3	-	-	-	1	1	-
CO3	-	1	-	2	1	-	-	3	-	-	1	-
CO4	1	-	2	-	-	-	1	-	-	1	-	2
CO5	-	-	-	3	-	3	2	-	-	-	-	-
CO6	2	-	-	2	-	3	2	-	1	2	-	-
CO7	-	-	1	3	2	3	-	1	-	-	-	1

Justification for the mapping

PO1:- Disciplinary Knowledge - Understand the basic concepts, fundamental principles and experimental findings and the scientific the ories related to food technology, food science and Food technology & engineering and its other fields related to the program.

CO1: Students will have a thorough understanding on effect of blending and baking on final product of bakery.
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CO4: The students may learn about the quality test of flour and what will be the effect of the flour quality on food.

CO6: Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.

PO2:- Communication Skills:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.
CO2: Students will able to prepare different bakery products with different equipments.
CO3: The students will be able to understand bakery and confectionery technology

PO3- Critical Thinking :- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.
CO4: The students may learn about the quality test of flour and what will be the effect of the flour quality on food.

PO4- Analytical Reasoning and Problem Solving- To enable the students with good scientific and engineering knowledge so as to comprehend, design, and create food products and devices for the food industry and provide solutions for the challenges in the food industry as well as in agriculture.
CO3: The students will be able to understand bakery and confectionery technology**.**
CO5: Students will know about the working of different bakery equipments in bakery industry.
CO6: Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.
CO7: Students will know about manufacturing of various techniques in bakery and confectionery industry.

PO5- Sense of Inquiry:- Curiously ask relevant questions for better understanding of fundamental concepts and principles, scientific theories and applications related to the study.
CO3: The students will be able to understand bakery and confectionery technology**.**
CO7: Students will know about manufacturing of various techniques in bakery and confectionery industry.

PO6- Use of Modern Tools:-
Operatemoderntools,equipment,instrumentsandlaboratorytechniquesto perform the experiments and write the programs in different languages.
CO2: Students will able to prepare different bakery products with different equipments.
CO5: Students will know about the working of different bakery equipments in bakery industry.
CO6: Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.
CO7: Students will know about manufacturing of various techniques in bakery and confectionery industry.

PO7- Research Skills:- Understand how to design, collect, analyze, interpret and evaluate information/data that is relevant to food technology.
CO4: The students may learn about the quality test of flour and what will be the effect of the flour quality on food.
CO5: Students will know about the working of different bakery equipments in bakery industry.

CO6: Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.

PO8- Application of Knowledge:- Develop a scientific outlook and apply the knowledge with respect to food technology.
CO3: The students will be able to understand bakery and confectionery technology**.**
CO7: Students will know about manufacturing of various techniques in bakery and confectionery industry.

PO9- Ethical Awareness- To train students in professional and ethical attitude, effective communication skills, team work skills and multidisciplinary approaches related to food technology and engineering.
CO1: Students will have a thorough understanding on effect of blending and baking on final product of bakery.
CO6: Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.

PO10:- Team Work - Understand the basic concepts, fundamental principles and experimental findings and the scientific the ories related to food technology, food science and Food technology & engineering and its other fields related to the program.

CO1: Students will have a thorough understanding on effect of blending and baking on final product of bakery.
CO2: Students will able to prepare different bakery products with different equipments.
CO4: The students may learn about the quality test of flour and what will be the effect of the flour quality on food.
CO6: Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.

PO11:- Environment and Sustainability:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.
CO2: Students will able to prepare different bakery products with different equipments.
CO3: The students will be able to understand bakery and confectionery technology

PO12:- Lifelong Learning:- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.
CO4: The students may learn about the quality test of flour and what will be the effect of the flour quality on food.

Second Year **Semester IV**

Food Chemistry-II

Theory **Paper No. FP-12**

Maximum Marks: 100 **Credits: 4**

Teaching Period: 4 Theory **Teaching Load: 60 Theory Period/Semester**

Learning Objectives:

- To understand the chemistry of foods - composition of food, role of each component and their interactions.
- To understand the functional aspects of food components and highlight their role in food processing.
- To study molecular structure of water, its reactions and filtration techniques
- To study different functions of water and other nutrients in body
- To study structure and working of all nutrients
- To learn different natural and artificial colors and flavours

Course Outcome:

CO1: Students will have a thorough understanding of water as a molecule and its importance in food.
CO2: The students will know about the major and minor minerals and its importance
CO3: The students will know molecular structure of water, its reactions and filtration techniques
CO4: Students will learn different functions of water and other nutrients in body
CO5: The students will know about structure and working of all nutrients
CO6: Students will know different natural and artificial colors and flavours
CO7: Students will know role of different components of food material during metabolism and processing

TOPIC-

Unit-1 Water: **12 Periods**

The basic molecule of life, physical properties of water, properties of hydration, salvation. Sorption isotherm, Bound water, free water, water activity. Distribution of water in various foods and moisture determination, Filteration Technology for Water: RO, UF, NF etc.

Unit-2 Minerals: **12 Periods**

Major and Minor Minerals, Metal uptake in canned foods, Toxic metals

Unit-3Food Additives: **12 Periods**

Definition, Functions, legals approval, major additives used in food processing, nutrient supplements, functional foods, phyto-chemicals and nutraceuticals

Unit-4Properties of Foods: **10 Periods**

Physical Properties, Acids, Bases, and Buffers, the Chemical Bond and Colloids

Unit 5. Food Flavour and Food Colurs **14 Periods**

Food Flavour: Introduction,definition and basic tastes, Description of food flavours and Flavour enhancers. Effect of different factors on flavor perceptions.

Food Colour (Pigments):

Introduction and classification, Food pigments (chlorophyll, carotenoids, anthocyanins and flavonoids, beet pigments, caramel)

Reference:

1. Fennema, Owen R, Food Chemistry, 3rd Ed., Marcell Dekker, New York, 1996
2. Whitehurst and Law, Enzymes in Food Technology, CRC Press, Canada, 2002
3. Wong, Dominic WS, Food Enzymes, Chapman and Hall, New York, 1995
4. Potter, N.N. and Hotchkiss, J. H, Food Science, 5th Ed., Chapman & Hall,1995
5. DeMan, J.M., Principles of Food Chemistry, AVI, New York, 1980
6. deMan, John M., Principles of Food Chemistry ,3rd Ed., Springer 1999
7. Desrosier, Norman W. and Desrosier., James N., The technology of food preservation , 4th Ed., Westport, Conn. : AVI Pub. Co., 1977.
8. Fuller, Gordon W, New Product Development from Concept to Marketplace, CRC Press, 2004.

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	1	-	3	-	1	2	-	3	-	1
CO2	3	2	1	-	2	-	-	4		3	2	1
CO3	3	-	-	2	3	-	-	-	-	3	-	-
CO4	-	-	-	6	-	5	5	4	2	-	4	-
CO5	2	2	1	-	-	2	-	-	-	2	2	1
CO6	2	-	1	4	-	-	1	-	-	2	-	1
CO7	3	-	-	-	-	-	-	-	-	-	2	-

Justification for the mapping

PO1:- Disciplinary Knowledge - Understand the basic concepts, fundamental principles and experimental findings and the scientific the ories related to food technology, food science and Food technology & engineering and its other fields related to the program.

food.

CO1: Students will have a thorough understanding of water as a molecule and its importance in food.

CO2: The students will know about the major and minor minerals and its importance and their uses.

CO3: The students will know molecular structure of water, its reactions and filtration techniques

CO5: The students will know about structure and working of all nutrients

CO6: Students will know different natural and artificial colors and flavours

CO7: Students will know role of different components of food material during metabolism and processing

PO2:- Communication Skills:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.

CO2: The students will know about the major and minor minerals and its importance and their uses.

CO5: The students will know about structure and working of all nutrients and how they react on food material.

PO3- Critical Thinking :- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.

CO1: Students will have a thorough understanding of water as a molecule and its importance in food.

CO2: The students will know about the major and minor minerals and its importance and their uses.

CO5: The students will know about structure and working of all nutrients and how they react on food material.

CO6: Students will know different natural and artificial colors and flavours and flavouring agents.

PO4- Analytical Reasoning and Problem Solving- To enable the students with good scientific and engineering knowledge so as to comprehend, design, and create food products and devices for the food industry and provide solutions for the challenges in the food industry as well as in agriculture.

CO3: The students will know molecular structure of water, its reactions and filtration techniques

CO4: Students will learn different functions of water and other nutrients in body

CO6: Students will know different natural and artificial colors and flavours and flavouring agents.

PO5- Sense of Inquiry:- Curiously ask relevant questions for better understanding of fundamental concepts and principles, scientific theories and applications related to the study.

CO1: Students will have a thorough understanding of water as a molecule and its importance in food.

CO2: The students will know about the major and minor minerals and its importance and their uses.

CO3: The students will know molecular structure of water, its reactions and filtration techniques

PO6- Use of Modern Tools:-

Operatemoderntools,equipment,instrumentsandlaboratorytechniquesto perform the experiments and write the programs in different languages.

CO4: Students will learn different functions of water and other nutrients in body

CO5: The students will know about structure and working of all nutrients and how they react on food material.

PO7- Research Skills:- Understand how to design, collect, analyze, interpret and evaluate information/data that is relevant to food technology.

CO1: Students will have a thorough understanding of water as a molecule and its importance in food.

CO4: Students will learn different functions of water and other nutrients in body

CO6: Students will know different natural and artificial colors and flavours and flavouring agents.

PO8- Application of Knowledge:- Develop a scientific outlook and apply the knowledge with respect to food technology.

CO1: Students will have a thorough understanding of water as a molecule and its importance in food.

CO2: The students will know about the major and minor minerals and its importance and their uses.

CO4: Students will learn different functions of water and other nutrients in body

PO9- Ethical Awareness- To train students in professional and ethical attitude, effective communication skills, team work skills and multidisciplinary approaches related to food technology and engineering.

CO4: Students will learn different functions of water and other nutrients in body.

PO10:- Team Work - Understand the basic concepts, fundamental principles and experimental findings and the scientific the ories related to food technology, food science and Food technology & engineering and its other fields related to the program.

CO1: Students will have a thorough understanding of water as a molecule and its importance in food.

CO2: The students will know about the major and minor minerals and its importance and their uses.

CO3: The students will know molecular structure of water, its reactions and filtration techniques

CO5: The students will know about structure and working of all nutrients

CO6: Students will know different natural and artificial colors and flavours

CO7: Students will know role of different components of food material during metabolism and processing

PO11:- Environment and Sustainability:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.

CO2: The students will know about the major and minor minerals and its importance and their uses.

CO5: The students will know about structure and working of all nutrients and how they react on food material.

PO12:- Lifelong Learning:- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.

CO1: Students will have a thorough understanding of water as a molecule and its importance in food.

CO2: The students will know about the major and minor minerals and its importance and their uses.
CO5: The students will know about structure and working of all nutrients and how they react on food material.
CO6: Students will know different natural and artificial colors and flavours and flavouring agents.

Second Year **Semester IV**

Food Chemistry-II

PRACTICAL **Paper No. FP-4.3**

Maximum Marks: 150 **Credits: 6**

Teaching Period: 2/weak **Teaching Load: 30 Practical/Semester (4 Period each)**

Learning Objectives:

- To understand the chemistry of foods - composition of food, role of each component and their interactions.
- To understand the functional aspects of food components and highlight their role in food processing.
- To study molecular structure of water, its reactions and filtration techniques
- To study different functions of water and other nutrients in body
- To study structure and working of all nutrients
- To learn different natural and artificial colors and flavours

Course Outcome:

CO1: Students will have a thorough understanding of water as a molecule and its importance in food.
CO2: The students will know about the major and minor minerals and its importance
CO3: The students will know molecular structure of water, its reactions and filtration techniques
CO4: Students will learn different functions of water and other nutrients in body
CO5: The students will know about structure and working of all nutrients
CO6: Students will know different natural and artificial colors and flavours
CO7: Students will know role of different components of food material during metabolism and processing

TOPIC-

1)	Preparation and Standardization of NaOH Solution	1P
2)	Water analysis- pH, Hardness, TDS, N, S, total phosphorous	4P
3)	Determination of percent free fatty acids and Acid value of fat /oil	1P
4)	Determination of specific gravity of food sample	1P
5)	Iodine value of fat / oil	1P
6)	Smoking points at fats & oils	1P
7)	Estimation of saponification value	1P
8)	Browning in fruits And Vegetables	1P
9)	Measurement of Food Color by Tintometer/ spectrophotometer	2P
10)	Effects of heat on fruits & vegetables	1P
11)	Testing pectin strength in fruit & vegetable extracts.	1P
12)	Natural acidity of milk	1P
13)	Isolation of starch	1P
14)	Isolation of casein	1P
15)	Changes on heating at starches / gelatinization properties of starches	1P
16)	Effect of Acid & alkali on colour of fruits & vegetables	1P
17)	Estimation of vitamins	1P
18)	Estimation of minerals	1P

19) Effect of sugar on boiling point of water 1P
20) Visit to food analysis laboratory 1P
21) Preparation of visit report & presentation 2P

Reference:

1. Fennema, Owen R, Food Chemistry, 3rd Ed., Marcell Dekker, New York, 1996
2. Whitehurst and Law, Enzymes in Food Technology, CRC Press, Canada, 2002
3. Wong, Dominic WS, Food Enzymes, Chapman and Hall, New York, 1995
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CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	1	-	3	-	1	2	-	3	-	1
CO2	3	2	1	-	2	-	-	4		3	2	1
CO3	3	-	-	2	3	-	-	-	-	3	-	-
CO4	-	-	-	6	-	5	5	4	2	-	4	-
CO5	2	2	1	-	-	2	-	-	-	2	2	1
CO6	2	-	1	4	-	-	1	-	-	2	-	1
CO7	3	-	-	-	-	-	-	-	-	-	2	-

Justification for the mapping

PO1:- Disciplinary Knowledge - Understand the basic concepts, fundamental principles and experimental findings and the scientific the ories related to food technology, food science and Food technology & engineering and its other fields related to the program.
food.

CO1: Students will have a thorough understanding of water as a molecule and its importance in food.

CO2: The students will know about the major and minor minerals and its importance and their uses.

CO3: The students will know molecular structure of water, its reactions and filtration techniques

CO5: The students will know about structure and working of all nutrients

CO6: Students will know different natural and artificial colors and flavours

CO7: Students will know role of different components of food material during metabolism and processing

PO2:- Communication Skills:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.

CO2: The students will know about the major and minor minerals and its importance and their uses.

CO5: The students will know about structure and working of all nutrients and how they react on food material.

PO3- Critical Thinking :- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.

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PO4- Analytical Reasoning and Problem Solving- To enable the students with good scientific and engineering knowledge so as to comprehend, design, and create food products and devices for the food industry and provide solutions for the challenges in the food industry as well as in agriculture.

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PO5- Sense of Inquiry:- Curiously ask relevant questions for better understanding of fundamental concepts and principles, scientific theories and applications related to the study.

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PO6- Use of Modern Tools:-

Operatemoderntools,equipment,instrumentsandlaboratorytechniquesto perform the experiments and write the programs in different languages.

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PO7- Research Skills:- Understand how to design, collect, analyze, interpret and evaluate information/data that is relevant to food technology.

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PO9- Ethical Awareness- To train students in professional and ethical attitude, effective communication skills, team work skills and multidisciplinary approaches related to food technology and engineering.
CO4: Students will learn different functions of water and other nutrients in body.

PO10:- Team Work - Understand the basic concepts, fundamental principles and experimental findings and the scientific the ories related to food technology, food science and Food technology & engineering and its other fields related to the program.
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CO2: The students will know about the major and minor minerals and its importance and their uses.
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CO5: The students will know about structure and working of all nutrients
CO6: Students will know different natural and artificial colors and flavours
CO7: Students will know role of different components of food material during metabolism and processing

PO11:- Environment and Sustainability:- Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.
CO2: The students will know about the major and minor minerals and its importance and their uses.
CO5: The students will know about structure and working of all nutrients and how they react on food material.
PO12:- Lifelong Learning:- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.
CO1: Students will have a thorough understanding of water as a molecule and its importance in food.
CO2: The students will know about the major and minor minerals and its importance and their uses.

CO5: The students will know about structure and working of all nutrients and how they react on food material.
CO6: Students will know different natural and artificial colors and flavours and flavouring agents.