



Anekant Education Society's

**Tuljaram Chaturchand College,
Baramati**

(Autonomous)

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

(Faculty of Food Technology & Research)

TY B.Voc (Food Technology) Semester –V

For Department Food Technology & Research

**Tuljaram Chaturchand College,
Baramati**

To be implemented from Academic Year 2019-20

Title of the Programme: TY 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)

PO-1	Disciplinary Knowledge	Understand the basic concepts, fundamental principles and experimental findings and the scientific theories related to food technology, food science and food technology & engineering and its other fields related to the program.
PO-2	Communication Skills	Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.
PO-3	Critical Thinking	Propose novel ideas in explaining the scientific data, facts and figures related to science and technology.
PO-4	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.
PO-5	Sense of Inquiry	Curiously ask relevant questions for better understanding of fundamental concepts and principles, scientific theories and applications related to the study.
PO-6	Use of Modern Tools	Operate modern tools, equipment, instruments and laboratory techniques to 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	Application of Knowledge	Develop a scientific outlook and apply the knowledge with respect to food technology.
PO-9	Ethical Awareness	To train students in professional and ethical attitude, effective communication skills, teamwork skills and multidisciplinary approaches related to food technology and engineering.
PO-10	Teamwork	Understand the basic concepts, fundamental principles and experimental 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	Environment and Sustainability	Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.
PO-12	Lifelong Learning	Propose novel ideas in explaining the scientific data, facts and figures related to science and technology.

Third Year

Semester V

Theory

**Dairy Technology
Paper No. FP-13**

Maximum Marks: 100

Credits: 4

Teaching Period: 4 Theory

Teaching Load: 60 Theory Period/Semester

Learning Objectives:

- To know the need and importance of dairy industry
- To know the compositional and technological aspects of milk.
- To study processed milk products.
- To learn about the processing of Dairy plant sanitization.
- To study about the planning, layout and requirement of dairy barns.
- To understand about the working of various dairy equipments.

Course Outcomes:

On completion of the course, students will be able to:

CO1: Give a comprehensive view of the composition of milk, its chemical, physical and organoleptic properties that can be applied in technological processing of milk.

CO2: Explain the production of milk and pre-treatment of milk.

CO3: Explain the dairy processing technologies.

CO4: Apply methods of analysis for dairy products and relate differences in composition and structure to differences in manufacturing processes.

CO5: Create a dairy product and evaluate relevant physical properties.

CO6: Understand about the working of various dairy equipments.

CO7: study about the planning, layout and requirement of dairy barns.

TOPIC-

Unit-1: Livestock and dairy building:

12 Lectures

Importance of livestock, their importance species and breeds, functional requirement, site selection, types of dairy barn, planning, layout and requirement of dairy barns.

Milk Societies, buying and collection of milk, transportation of milk, milk reception in dairies. Quality and quantity test at reception

Unit-2: Dairy Chemistry and Microbiology

12 Lectures

Introduction, Milk - composition, food and nutritive value, physico-chemical and microbiological Properties of milk, Judging and Grading of milk,

Unit-3: Milk Processing

12 Lectures

Milk Processing flow sheet – Filtration / clarification, Storage of milk, Standardization –simple problems in standardization, Homogenization, Pasteurization – Types of pasteurization process,

Sterilization of milk. Equipments used in each process - Cream separating centrifuges, Pasteurizers (Heat Exchangers), Homogenizers, Bottle and pouch fillers, Milk Chillers.

Unit-4: Manufacture of Dairy Products

12 Lectures

Manufacture of Ice Cream, Cream, Paneer, Butter, Ghee, Milk powder, Khowa, Cheese and milk based sweets (Only method of preparation)

Equipment used for manufacture of each product like Butter churn, ghee boiler, Evaporator, Nozzel, Spray and Drum Dryers etc.

Unit-5: Manufacture of other Dairy Products and sanitization

12 Lectures

Manufacture of Homogenized, Standardized, rehydrated, Toned Milk and Sweetened Condensed milk, Extraction of casein from milk – properties - composition and industrial uses. Production of lactose and whey

Fermented products – Yoghurt, Curd, acidophilus milk, butter milk

Dairy plant sanitization – Cleaning in place – bottle and can washing, cleaning of tankers and silos – Detergents and sanitizers used.

References:-

1. De Sukumar, Outlines of Dairy Technology, Oxford University Press, Oxford.2007
2. Robinson, R.K. (2 vol.) 1986. Modern Dairy Technology. Elsevier Applied Science, UK.
3. Warner, J.M. 1976. Principles of Dairy Processing. Wiley Eastern Ltd., New Delhi.
4. Yarpur, W.J. and Hall, C.W. 1975. Dairy Technology and Engineering. AVI, Westport.
5. Rosenmal, I. 1991. Milk and Milk Products. VCH. New York.
6. Webb and Johnson, Fundamentals of Dairy Chemistry

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	1	-	4	-	-	2	-	3	-	-
CO2	3	2	1	-	2	-	-	4		3	2	1
CO3	1	-	3	2	3	-	-	-	-	1	-	-
CO4	-	-	-	4	-	5	3	-	-	-	-	-
CO5	-	1	1	-	-	2	-	-	-	-	2	1
CO6	2	-	1	4	-	-	1	-	-	2	2	-
CO7	-	1	-	-	-	-	-	-	-	-	2	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: Student will be able to comprehensive view of the composition of milk, its chemical, physical and organoleptic properties that can be applied in technological processing of milk.

CO2: Student can get knowledge about the production of milk and pre-treatment of milk and different equipment.

CO3: Student can get information about the dairy processing technologies and they can use in dairy plant.

CO6: Student can understand about the working of various dairy equipments.

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

CO2: Student can get knowledge about the production of milk and pre-treatment of milk and different equipment.

CO5: Student can create a dairy product and evaluate relevant physical properties.

CO7: To study about the planning, layout and requirement of dairy barns so they can use it for their business.

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

Science and technology.

CO1: Student will be able to comprehensive view of the composition of milk, its chemical, physical and organoleptic properties that can be applied in technological processing of milk.

CO2: Student can get knowledge about the production of milk and pre-treatment of milk and different equipment.

CO3: Student can get information about the dairy processing technologies and they can use in dairy plant.

CO5: Student can create a dairy product and evaluate relevant physical properties.

CO6: Student can understand about the working of various dairy equipments.

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: Student can get information about the dairy processing technologies and they can use in dairy plant.

CO4: Apply methods of analysis for dairy products and relate differences in composition and structure to differences in manufacturing processes.

CO6: Student can understand about the working of various dairy equipments.

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: Student will be able to comprehensive view of the composition of milk, its chemical, physical and organoleptic properties that can be applied in technological processing of milk.

CO2: Student can get knowledge about the production of milk and pre-treatment of milk and different equipment.

CO3: Student can get information about the dairy processing technologies and they can use in dairy plant.

PO6- Use of Modern Tools:-

Operate modern tools, equipment, instruments and laboratory techniques to perform the experiments and write the programs in different languages.

CO4: Apply methods of analysis for dairy products and relate differences in composition and structure to differences in manufacturing processes.

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

CO4: Students will get practical skills for processing of food after postharvest like preparation of various food products.

CO5: Student can create a dairy product and evaluate relevant physical properties.

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

CO1: Student will be able to comprehensive view of the composition of milk, its chemical, physical and organoleptic properties that can be applied in technological processing of milk.

CO2: Student can get knowledge about the production of milk and pre-treatment of milk and different equipment.

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 theories related to food technology, food science and Food technology & engineering and its other fields related to the program.

CO1: Student will be able to comprehensive view of the composition of milk, its chemical, physical and organoleptic properties that can be applied in technological processing of milk.

CO2: Student can get knowledge about the production of milk and pre-treatment of milk and different equipment.

CO3: Student can get information about the dairy processing technologies and they can use in dairy plant.

CO6: Student can understand about the working of various dairy equipments.

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

CO2: Student can get knowledge about the production of milk and pre-treatment of milk and different equipment.

CO5: Student can create a dairy product and evaluate relevant physical properties.

CO7: To study about the planning, layout and requirement of dairy barns so they can use it for their business.

Po12:- Lifelong Learning:- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.

CO1: Student will be able to comprehensive view of the composition of milk, its chemical, physical and organoleptic properties that can be applied in technological processing of milk.

CO2: Student can get knowledge about the production of milk and pre-treatment of milk and different equipment.

CO3: Student can get information about the dairy processing technologies and they can use in dairy plant.

CO5: Student can create a dairy product and evaluate relevant physical properties.

CO6: Student can understand about the working of various dairy equipments.

Third Year

Semester V

PRACTICAL

**Dairy Technology
Paper No. FP-5.1**

Maximum Marks: 150

Credits: 6

Teaching Period: 2/week

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

Learning Objectives:

- To know the need and importance of dairy industry
- To know the compositional and technological aspects of milk.
- To study processed milk products.
- To learn about the chemical analysis of milk.
- To study about the processing of different milk based products.
- To understand about the working of various dairy equipments.

Course Outcomes:

On completion of the course, students will be able to:

- CO1: Give a comprehensive view of the composition of milk, its chemical, physical and organoleptic properties that can be applied in technological processing of milk.
- CO2: Explain the production of milk and pre-treatment of milk.
- CO3: Explain the dairy processing technologies.
- CO4: study about the processing of different milk based products.
- CO5: Create a dairy product and evaluate relevant physical properties.
- CO6: Understand about the chemical analysis of milk.
- CO7: study about the methods of detection of adulteration in milk

TOPIC-

1. Physical examination of milk
2. Platform tests of milk
3. Detection of adulteration of milk
4. Testing of milk for acidity
5. Specific gravity of milk
6. To determine protein content in milk.
7. Preparation of Dahi
8. Preparation of Lassi
9. To prepare casein and calculate its yield.
10. Preparation of Basundi.
11. Preparation of Khoa.
12. Preparation of Gulabjamun.
13. Preparation of Paneer.
14. Preparation of Rasgulla.

15. Preparation of Flavoured milk.
16. Preparation of Ice-cream.
17. Preparation of Shrikhand.
18. Preparation of Butter
19. Preparation of Ghee
20. Preparation of Whey Powder
21. Preparation of SMP
22. Preparation of WMP
23. Visit to Dairy Industry
24. Preparation of Report and Presentation

References:-

7. De Sukumar, Outlines of Dairy Technology, Oxford University Press, Oxford.2007
8. Robinson, R.K. (2 vol.) 1986. Modern Dairy Technology. Elsevier Applied Science, UK.
9. Warner, J.M. 1976. Principles of Dairy Processing. Wiley Eastern Ltd., New Delhi.
10. Yarpar, W.J. and Hall, C.W. 1975. Dairy Technology and Engineering. AVI, Westport.
11. Rosenmal, I. 1991. Milk and Milk Products. VCH. New York.
12. Webb and Johnson, Fundamentals of Dairy Chemistry

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

Justification for the mapping

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

CO1: Give a comprehensive view of the composition of milk, its chemical, physical and organoleptic properties that can be applied in technological processing of milk.

CO2: Student can explain the production of milk and pre-treatment of milk.

CO3: Student can get information about the dairy processing technologies and different equipment so they can easily handle them in any dairy plant.

CO6: Student can understand about the chemical analysis of milk and that is useful in daily life.

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

CO2: Student can explain the production of milk and pre-treatment of milk.

CO5: Create a dairy product and evaluate relevant physical properties.

CO7: to study about the methods of detection of adulteration in milk and that is important in daily life also get information about different adulterants and their effects.

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

Science and technology.

CO1: Give a comprehensive view of the composition of milk, its chemical, physical and organoleptic properties that can be applied in technological processing of milk.

CO2: Student can explain the production of milk and pre-treatment of milk.

CO3: Student can get information about the dairy processing technologies and different equipment so the can easily handle them in any dairy plant.

CO5: Create a dairy product and evaluate relevant physical properties.

CO6: Student can understand about the chemical analysis of milk and that is useful in daily life.

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: Student can get information about the dairy processing technologies and different equipment so the can easily handle them in any dairy plant.

CO4: student can study about the processing of different milk based products and their health benefits.

CO6: Student can understand about the chemical analysis of milk and that is useful in daily life.

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: Give a comprehensive view of the composition of milk, its chemical, physical and organoleptic properties that can be applied in technological processing of milk.

CO2: Student can explain the production of milk and pre-treatment of milk.

CO3: Student can get information about the dairy processing technologies and different equipment so the can easily handle them in any dairy plant.

PO6- Use of Modern Tools:-

Operate modern tools, equipment, instruments and laboratory techniques to perform the experiments and write the programs in different languages.

CO4: student can study about the processing of different milk based products and their health benefits.

CO5: Create a dairy product and evaluate relevant physical properties.

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

CO4: student can study about the processing of different milk based products and their health benefits.

CO6: Student can understand about the chemical analysis of milk and that is useful in daily life.

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

CO1: Give a comprehensive view of the composition of milk, its chemical, physical and organoleptic properties that can be applied in technological processing of milk.

CO2: Student can explain the production of milk and pre-treatment of milk.

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 theories related to food technology, food science and Food technology & engineering and its other fields related to the program.

CO1: Give a comprehensive view of the composition of milk, its chemical, physical and organoleptic properties that can be applied in technological processing of milk.

CO2: Student can explain the production of milk and pre-treatment of milk.

CO3: Student can get information about the dairy processing technologies and different equipment so they can easily handle them in any dairy plant.

CO6: Student can understand about the chemical analysis of milk and that is useful in daily life.

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

CO2: Student can explain the production of milk and pre-treatment of milk.

CO5: Create a dairy product and evaluate relevant physical properties.

CO7: to study about the methods of detection of adulteration in milk and that is important in daily life also get information about different adulterants and their effects.

Po12:- Lifelong Learning:- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.

CO1: Give a comprehensive view of the composition of milk, its chemical, physical and organoleptic properties that can be applied in technological processing of milk.

CO2: Student can explain the production of milk and pre-treatment of milk.

CO3: Student can get information about the dairy processing technologies and different equipment so they can easily handle them in any dairy plant.

CO5: Create a dairy product and evaluate relevant physical properties.

CO6: Student can understand about the chemical analysis of milk and that is useful in daily life.

Third Year

Semester V

**Food Quality, Laws and Regulations
Paper No. FP-14**

Theory

Maximum Marks: 100

Credits: 4

Teaching Period: 4 Theory

Teaching Load: 60 Theory Period/Semester

Learning Objectives:

- To learn about quality management in food production chain.
- To understand the role of food standards and regulations in maintaining food quality.
- To learn about Government agencies, Voluntary Agencies & International Organizations and Agreements in the area of Food Standardization and quality control.
- To study about the methods of detection of some Adulterants.
- To understand about the role and responsibilities of Quality control department of food
- To study about the Sensory characteristics of food.

Outcomes:

On completion of the course, students will be able to:

CO1: Be able to critically evaluate the recent developments in the control of food safety.

CO2: Have an integrated view of the issues involved.

CO3: Be able to conduct risk assessments of food safety problems including genetic modification.

CO4: Demonstrate detailed knowledge of the requirements for compliance with national and international food safety legislation.

CO5: Know how to control and maintain a quality management system.

CO6: Study about the Sensory characteristics of food.

CO7: understand about the role and responsibilities of Quality control department of food

TOPIC-

Unit-1: Food Quality: Introduction to food quality management – Definition, quality concepts, quality perception, quality attributes, safety, health, sensory, shelf life, convenience.

Evaluation of Food quality: Definition, Quality attributes of food, Sensory characteristics of Food, Sensory tests, Instruments used for colour & texture evaluation, microbial quality of food.

10 Lectures

Unit-2: Quality control and Effect of processing and storage on quality of food: Quality control of food, Role and responsibilities of Quality control department of food industry, Effect of processing on Quality of Food, Effect of storage on Quality of Food. **10 Lectures**

Unit-3: Food Adulteration: Introduction, Classification of Adulterants, Harmful effects of Adulterants, Methods of detection of some Adulterants. **10 Lectures**

Unit-4: Food Laws and Standards: Food Standards and regulations in India, Prevention of Food Adulteration Act, Food Safety Standard Authority of India (FSSAI).

Compulsory National Legislations: Essential Commodities Act, Standards of Weights and Measures, Export (Quality control and Inspection) Act

Voluntary based Product Certifications: Bureau of Indian Standards Act, Agmark Grading and Marketing Act and Rules Nutritional Labeling & Education act. **15 Lectures**

Unit-5: Consumer Protection

Government agencies: Municipal Laboratories, Food and Drug Administration, The central Food Testing Laboratory, Export Inspection Council Laboratory

Voluntary Agencies: Quality control laboratories of companies, Quality control laboratories of Consumer co-operatives, Private testing laboratories, Consumer Guidance Society

International Organizations and Agreements in the area of Food Standardization and quality control: Codex Alimentarius, Codex India, World Health Organization, International Organization for Standardization, Food and Agriculture Organization, Joint FAO/WHO Expert committee on food additives, British Retail Consortium(BRC) standard for Foods.

15 Lectures

References

1. Food Science – Norman N. Potter, Joseph H. Hotchkiss CBS Publishers and distributors, New Delhi, 1997 5th edition.
2. Cereal technology – Matz.
3. Manay NS and Shadaksharaswamy M, Food-Facts and Principles, New Age International (P) Ltd. Publishers, New Delhi, 1987
4. Quality Control for Food Industry Krammer&Twigg
5. Quality Control in Food Industry S.N. Herschdogrfer
6. B. Srilakshmi, Food science, New Age Publishers, 2002
7. Tannenbaum, S.R. Ed. 1979. “Nutritional and Safety Aspects of Food Processing”, Marcel
8. Pieterneel A, Luning, Willem J. Marcelis, Food Quality Management Technological and Managerial principles and practices, Wageningen,2009.

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

Justification for the mapping

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

CO1: Be able to critically evaluate the recent developments in the control of food safety.

CO3: Be able to conduct risk assessments of food safety problems including genetic modification.

CO4: Demonstrate detailed knowledge of the requirements for compliance with national and international food safety legislation.

CO5: Know how to control and maintain a quality management system.

CO6: Study about the Sensory characteristics of food.

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

CO1: Be able to critically evaluate the recent developments in the control of food safety.

CO2: Have an integrated view of the issues involved so student can give their ideas.

CO3: Be able to conduct risk assessments of food safety problems including genetic modification.

CO4: Demonstrate detailed knowledge of the requirements for compliance with national and international food safety legislation.

CO5: Know how to control and maintain a quality management system and can be useful during industrial audit.

CO7: understand about the role and responsibilities of Quality control department of food

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

Science and technology.

CO2: Have an integrated view of the issues involved so student can give their ideas.

CO3: Be able to conduct risk assessments of food safety problems including genetic modification.

CO6: Study about the Sensory characteristics of food so student can give different analysis for different food products.

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.

CO1: Be able to critically evaluate the recent developments in the control of food safety.

CO3: Be able to conduct risk assessments of food safety problems including genetic modification

CO5: Know how to control and maintain a quality management system and can be useful during industrial audit.

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

CO2: Have an integrated view of the issues involved so student can give their ideas.

CO3: Be able to conduct risk assessments of food safety problems including genetic modification.

CO4: Demonstrate detailed knowledge of the requirements for compliance with national and international food safety legislation.

PO6- Use of Modern Tools:-

Operate modern tools, equipment, instruments and laboratory techniques to perform the experiments and write the programs in different languages.

CO7: understand about the role and responsibilities of Quality control department of food

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

CO7: understand about the role and responsibilities of Quality control department of food

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

CO1: Be able to critically evaluate the recent developments in the control of food safety.

CO2: Have an integrated view of the issues involved so student can give their ideas.

CO5: Know how to control and maintain a quality management system and can be useful during industrial audit.

CO6: Study about the Sensory characteristics of food so student can give different analysis for different food products.

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: Be able to critically evaluate the recent developments in the control of food safety.

CO2: Have an integrated view of the issues involved so student can give their ideas.

CO3: Be able to conduct risk assessments of food safety problems including genetic modification.

CO4: Demonstrate detailed knowledge of the requirements for compliance with national and international food safety legislation.

CO5: Know how to control and maintain a quality management system and can be useful during industrial audit.

CO6: Study about the Sensory characteristics of food so student can give different analysis for different food products.

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

CO1: Be able to critically evaluate the recent developments in the control of food safety.

CO3: Be able to conduct risk assessments of food safety problems including genetic modification.

CO4: Demonstrate detailed knowledge of the requirements for compliance with national and international food safety legislation.

CO5: Know how to control and maintain a quality management system.

CO6: Study about the Sensory characteristics of food.

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

CO1: Be able to critically evaluate the recent developments in the control of food safety.

CO2: Have an integrated view of the issues involved so student can give their ideas.

CO3: Be able to conduct risk assessments of food safety problems including genetic modification.

CO4: Demonstrate detailed knowledge of the requirements for compliance with national and international food safety legislation.

CO5: Know how to control and maintain a quality management system and can be useful during industrial audit.

CO7: understand about the role and responsibilities of Quality control department of food life also get information about different adulterants and their effects.

Po12:- Lifelong Learning:- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.

CO2: Have an integrated view of the issues involved so student can give their ideas.

CO3: Be able to conduct risk assessments of food safety problems including genetic modification.

CO6: Study about the Sensory characteristics of food so student can give different analysis for different food products.

Third Year

Semester VI

Principles of Post Harvests Technology

Theory

Paper No. FP-15

Maximum Marks: 100

Credits: 4

Teaching Period: 4 Theory

Teaching Load: 60 Theory Period/Semester

Learning Objectives:

- To obtain that the student has the knowledge of the post-harvest physiology and technology of foods and the necessary abilities
- To design different post-harvest treatments and strategies, understanding the scientific basis.
- To study about the structure & composition of grains.
- To learn about the Food storage systems.
- To study about the engineering Properties of post harvest Materials
- To understand the history and role of post-harvest technology.

Course Outcomes:

On completion of the course, students will be able to:

CO1: Understand technologies of post harvest technology and its role in providing better quality produce to the consumer.

CO2: Understand importance prevention of losses

CO3: Understand utilization of the produce and methods for shelf life extension

CO4: Understand cold chain management

CO5: Learn quality control and various standards required for domestic and export market.

CO6: Understand the history and role of post-harvest technology.

CO7: Learn about the Food storage systems.

TOPIC

Unit-1: History and role of post-harvest technology; Harvesting factors and Quality- Pre-harvesting factor, Maturity of harvest, Harvesting Methods, Post-Harvest Physiology **12 Lectures**

Unit-2: Structure and Composition of Food Grains, Engineering Properties of agricultural Materials, Physical Properties, Mechanical Properties, thermal properties, Rheological Properties and Cleaning and Grading . **12 Lectures**

Unit-3: Post harvest technology of Cereal, Pulses, Oilseeds, Fruits and Vegetables, Material Handling, Transportation and Marketing **12 Lectures**

Unit-4: Post Harvest Handling of Foods of Animal Origin, Post Slaughter Handling of Meat, Post-Harvest Handling of Fish and Seafood and Post-Harvest Handling of Milk. **12 Lectures**

Unit-5 Food storage systems- Direct Damage, Indirect damage, Sources of infestation, Traditional storage structures, improved storage structures, modern storage structures, storage of agricultural perishables, controlled and Modified atmosphere storage, Post-harvest treatments for quality retention of horticultural crops, methods to reduce decay. **12 Lectures**

References:

- 1) Preservation of Fruits & Vegetables by Srivastava & Kumar. 1996. Intl. Book Publishing Co. Lucknow
- 2) Preservation of Fruits & Vegetables by Siddappa et al. 1999. ICAR, New Delhi
- 3) An introduction to Post Harvest Technology by RBH Wills. 2003.
- 4) Post Harvest Technology of Fruits & Vegetables by Verma& Joshi. 2000. Indus Publication, New Delhi
- 5) Hand Book of Post Harvest Technology by Chakravarty et al. 2003. Mercer-Dekker Ltd
- 6) Kadar, A.A. 1992. *Post-harvest Technology of Horticultural Crops*. 2nd Ed. University of California.
- 7) Salunkhe, D.K., Bolia, H.R. and Reddy, N.R. 1991. *Storage, Processing and Nutritional Quality of Fruits and Vegetables*. Vol. I. Fruits and Vegetables. CRC.
- 8) Verma, L.R. and Joshi, V.K. 2000. *Post Harvest Technology of Fruits and Vegetables*. Indus Publ.
- 9) Thompson, A.K. 1995. Post harvest technology of fruits and vegetables. Blackwell Sciences.
- 10) Peter, K.V. 2003. Plantation Crops. NBT, New Delhi

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

Justification for the mapping

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

CO2: Understand importance prevention of losses

CO3: Understand utilization of the produce and methods for shelf life extension

CO5: Learn quality control and various standards required for domestic and export market.

CO6: Understand the history and role of post-harvest technology.

CO7: Learn about the Food storage systems.

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

CO2: Understand importance prevention of losses

CO5: Learn quality control and various standards required for domestic and export market.

CO6: Understand the history and role of post-harvest technology.

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

Science and technology.

CO1: Understand technologies of post harvest technology and its role in providing better quality produce to the consumer.

CO2: Understand importance prevention of losses

CO5: Learn quality control and various standards required for domestic and export market.

CO6: Understand the history and role of post-harvest technology.

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: Understand utilization of the produce and methods for shelf life extension

CO4: Understand cold chain management so they can use it in industries.

CO5: Learn quality control and various standards required for domestic and export market.

CO6: Understand the history and role of post-harvest technology.

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: Understand technologies of post harvest technology and its role in providing better quality produce to the consumer.

CO2: Understand importance prevention of losses

CO3: Understand utilization of the produce and methods for shelf life extension

PO6- Use of Modern Tools:-

Operate modern tools, equipment, instruments and laboratory techniques to perform the experiments and write the programs in different languages.

CO4: Understand cold chain management so they can use it in industries.

CO5: Learn quality control and various standards required for domestic and export market.

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

CO1: Understand technologies of post harvest technology and its role in providing better quality produce to the consumer.

CO4: Understand cold chain management so they can use it in industries.

CO5: Learn quality control and various standards required for domestic and export market.

CO6: Understand the history and role of post-harvest technology.

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

CO1: Understand technologies of post harvest technology and its role in providing better quality produce to the consumer.

CO2: Understand importance prevention of losses

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: Understand cold chain management so they can use it in industries.

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

CO2: Understand importance prevention of losses

CO3: Understand utilization of the produce and methods for shelf life extension

CO5: Learn quality control and various standards required for domestic and export market.

CO6: Understand the history and role of post-harvest technology.

CO7: Learn about the Food storage systems.

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

CO2: Understand importance prevention of losses

CO5: Learn quality control and various standards required for domestic and export market.

CO6: Understand the history and role of post-harvest technology.

Po12:- Lifelong Learning:- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.

CO1: Understand technologies of post harvest technology and its role in providing better quality produce to the consumer.

CO2: Understand importance prevention of losses

CO5: Learn quality control and various standards required for domestic and export market.

CO6: Understand the history and role of post-harvest technology.

Third Year

Semester V

PRACTICAL

**Entrepreneurship Development
Paper No. FP-5.2**

Maximum Marks: 150

Credits: 6

Teaching Period: 2/week

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

Learning Objectives:

- To understand the importance of entrepreneurship development
- To learn about the preparation of Visit report.
- To study about the develop & perform market survey format.
- To learn about to set goals to become successful entrepreneur
- To study about the Preparation of project feasibility report
- To understand the Case analysis and presentations

Course Outcomes:

On completion of the course, students will be able to:

CO1: Understand the importance of entrepreneurship development.

CO2: Learn about the preparation of Visit report.

CO3: Study about the develop & perform market survey format.

CO4: Learn about to set goals to become successful entrepreneur

CO5: Study about the Preparation of project feasibility report

CO6: Understand the Case analysis and presentations

CO7: Understand the Identification of self-employment areas.

TOPIC

1. Preparatory activity

- a. List various types of industries.
- b. Narrate need of self-employment.
- c. Anticipate importance of entrepreneurship development

2. Creativeness and innovativeness:

- a. Teacher will assign any one Food Technology based (in a group of not more than 5-6 students) item/product, (may be Functional foods, convenient foods, Enriched and fortified foods, etc.). List at least ten uses of this item/product other than pre-defined. Think out of box.
- b. List at least ten Food Technology products which have passed through innovativeness.

3. Identification of self-employment areas:

- a. Teacher will assign this exercise in group of 5-6 students.
- b. List at least five Food Technology based areas which have, in group's opinion, self-employment potential. Select any one promising area.
- c. Develop market survey format for the selected area.

- d. Perform market survey for self-employment opportunities.
- e. Describe the outcome. Also narrate the experience.
- f. It is compulsory to attach photographs of group conducting market survey.

4. Visit report:

- a. Visit nearby :
 - i. District Industries Centre (DIC).
 - ii. Any one financial institution including bank.
 - iii. Training institute / GITCO/EDI/ iNDEXTb/etc.
- b. Prepare the visit report which include followings:
 - i. Brief history of organization.
 - ii. Type and details of services /support/ assistance being given.
 - iii. Any other information which are useful to be self-employer or entrepreneur.
 - iv. Brochures/technical literature collected from agencies.

5. Preparing project feasibility report of assigned product:

- a. Teacher will assign any one product (physical or service based having Food Technology) to the group of 5-6 students.
- b. Prepare project feasibility report (Technical and financial). Specifically include capacity requirement calculations and project set up planning details. Also present the same to whole batch.

6. Case analysis and presentations:

Teacher will assign one case of successful entrepreneur and one case of failed entrepreneur to the group of 5-6 students. Student will discuss in group, will analyze and will present the same to whole batch. Student will also prepare the report on analysis. Case may be put up with printed pages but analysis has to be hand written.

References:

- 1) Entrepreneurship development and Management, R.K.Singal, S.K.Kataria and Sons.
- 2) Developing Entrepreneurship,Pareek & Co. Learning systems,Delhi
- 3) Entrepreneurship & Venture – Management, Clifford and Bombak, Joseph R. Momanso.
- 4) Planning an Industrial unit, J. N. Vyas.
- 5) EDI study material, EDI, BHAT, Ahmedabad, Website : <http://www.ediindia.org>

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

Justification for the mapping

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

CO1: Student will understand the importance of entrepreneurship development.

CO2: Student will Learn about the preparation of Visit report so they can easily prepare any project report.

CO3: To Study about the develop & perform market survey format for their business.

CO6: To Understand the Case analysis and presentations for the confidence development.

CO7: Understand the Identification of self-employment areas so they can start their own business.

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

CO2: Student will Learn about the preparation of Visit report so they can easily prepare any project report.

CO3: To Study about the develop & perform market survey format for their business.

CO4: Learn about to set goals to become successful entrepreneur.

CO6: To Understand the Case analysis and presentations for the confidence development.

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

Science and technology.

CO1: Student will understand the importance of entrepreneurship development.

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.

CO2: Student will Learn about the preparation of Visit report so they can easily prepare any project report.

CO5: Study about the Preparation of project feasibility report

CO6: To Understand the Case analysis and presentations for the confidence development.

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: Student will understand the importance of entrepreneurship development.

CO3: To Study about the develop & perform market survey format for their business.

CO4: Learn about to set goals to become successful entrepreneur.

CO5: Study about the Preparation of project feasibility report

CO7: Understand the Identification of self-employment areas so they can start their own business.

PO6- Use of Modern Tools:-

Operate modern tools, equipment, instruments and laboratory techniques to perform the experiments and write the programs in different languages.

CO2: Student will Learn about the preparation of Visit report so they can easily prepare any project report.

CO3: To Study about the develop & perform market survey format for their business.

PO7- Research Skills:- Understand how to design, collect, analyze, interpret **CO3:** To Study about the develop & perform market survey format for their business.

CO4: Learn about to set goals to become successful entrepreneur.

CO6: To Understand the Case analysis and presentations for the confidence development.

CO7: Understand the Identification of self-employment areas so they can start their own business.

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

CO5: Study about the Preparation of project feasibility report

CO7: Understand the Identification of self-employment areas so they can start their own business.

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: Student will understand the importance of entrepreneurship development.

CO2: Student will Learn about the preparation of Visit report so they can easily prepare any project report.

CO3: To Study about the develop & perform market survey format for their business.

CO5: Study about the Preparation of project feasibility report

CO6: To Understand the Case analysis and presentations for the confidence development.

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: Student will understand the importance of entrepreneurship development.

CO2: Student will Learn about the preparation of Visit report so they can easily prepare any project report.

CO3: To Study about the develop & perform market survey format for their business.

CO6: To Understand the Case analysis and presentations for the confidence development.

CO7: Understand the Identification of self-employment areas so they can start their own business.

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

CO2: Student will Learn about the preparation of Visit report so they can easily prepare any project report.

CO3: To Study about the develop & perform market survey format for their business.

CO4: Learn about to set goals to become successful entrepreneur.

CO6: To Understand the Case analysis and presentations for the confidence development.

Po12:- Lifelong Learning:- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.

CO1: Student will understand the importance of entrepreneurship development.

Third Year

Semester V

PRACTICAL

**Project
Paper No. FP-5.3**

Maximum Marks: 150

Credits: 6

Teaching Period: 2/week

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

Learning Objectives:

- To understand the importance of Product Development.
- To learn about the new product development
- To study about the perform market survey about new product.
- To learn about to analysis of new product.
- To study about the Preparation of project report
- To learn about the publication of research paper into national &international journal.
- To understand the process of launching a new product.

Course Outcomes:

On completion of the course, students will be able to:

CO1: understand the importance of Product Development.

CO2: learn about the new product development

CO3: Study about the perform market survey about new product.

CO4: Learn about to analysis of new product.

CO5: Study about the Preparation of project report

CO6: learn about the publication of research paper into national &international journal.

CO7: understand the process of launching a new product.

INFORMATION

Group of four students shall undertake project work related to design and development of innovative food product, its quality evaluation, packaging, labeling and shelf life testing under the supervision of a faculty member. In principle, the research /design work has to be carried out by the student himself taking advice from his supervisor when problem arises. The work will be allotted at the beginning of the fifth semester specifying the different aspects to be carried out by the student. At the end of the semester the student will submit an interim report on his/her work in typed form. Evaluation shall include oral presentation.

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

Justification for the mapping

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

CO2: learn about the new product development so they can think something different.

CO3: Study about the perform market survey about new product so they understand the marketing skill.

CO5: Study about the Preparation of project report so student can easily published their research paper

CO6: learn about the publication of research paper into national & international journal.

CO7: understand the process of launching a new product.

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

CO2: learn about the new product development so they can think something different.

CO5: Study about the Preparation of project report so student can easily published their research paper

CO6: learn about the publication of research paper into national & international journal.

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

CO2: learn about the new product development so they can think something different.

CO5: Study about the Preparation of project report so student can easily published their research paper

CO6: learn about the publication of research paper into national & international journal.

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: Study about the perform market survey about new product so the understand the marketing skill.

CO4: Learn about to analysis of new product so student can do analysis of any new product in any food industry.

CO6: learn about the publication of research paper into national &international journal.

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: understand the importance of Product Development so student can ask many questions related to their topic and understand the new product and their uses.

CO3: Study about the perform market survey about new product so the understand the marketing skill.

PO6- Use of Modern Tools:-

Operate modern tools, equipment, instruments and laboratory techniques to perform the experiments and write the programs in different languages.

CO4: Learn about to analysis of new product so student can do analysis of any new product in any food industry.

CO5: Study about the Preparation of project report so student can easily published their research paper

PO7- Research Skills:- Understand how to design, collect, analyze, interpret **CO3:** To Study about the develop & perform market survey format for their business.

CO4: Learn about to analysis of new product so student can do analysis of any new product in any food industry.

CO6: learn about the publication of research paper into national &international journal.

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

CO1: understand the importance of Product Development so student can ask many questions related to their topic and understand the new product and their uses.

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 theories related to food technology, food science and

Food technology & engineering and its other fields related to the program.

CO2: learn about the new product development so they can think something different.

CO3: Study about the perform market survey about new product so the understand the marketing skill.

CO5: Study about the Preparation of project report so student can easily published their research paper

CO6: learn about the publication of research paper into national &international journal.

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

CO2: learn about the new product development so they can think something different.

CO5: Study about the Preparation of project report so student can easily published their research paper

CO6: learn about the publication of research paper into national &international journal.

Po12:- Lifelong Learning:- Propose novel ideas in explaining the scientific data, facts and figures related to Science and technology.

CO2: learn about the new product development so they can think something different.

CO5: Study about the Preparation of project report so student can easily published their research paper

CO6: learn about the publication of research paper into national &international journal.