Anekant Education Society's

Tuljaram Chaturchand College, Baramati

(Autonomous)

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

(Faculty of Food Technology& Research)

CBCS Syllabus

TY B.Voc (Food Technology) Semester –V

For Department Food Technology & Research

Tuljaram Chaturchand College, Baramati

Choice Based Credit System Syllabus (2024 Pattern)

TobeimplementedfromAcademicYear2024-2025

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

Preamble

AES's, TuljaramChaturchand College of Arts, Science and Commerce (Autonomous) has made the decision to change the syllabi of across various faculties from June, 2023 by incorporating the guidelines and provisions outlined in the National Education Policy (NEP), 2020. The NEP envisions making education more holistic and effective and to lay emphasis on the integration of general (academic) education, vocational education and experiential learning. The NEP introduces holistic and multidisciplinary education that would help to develop intellectual, scientific, social, physical, emotional, ethical and moral capacities of the students. The NEP 2020 envisages flexible curricular structures and learning based outcome approach for the development of the students. By establishing a nationally accepted and internationally comparable credit structure and courses framework, the NEP 2020 aims to promote educational excellence, facilitate seamless academic mobility, and enhance the global competitiveness of Indian students. It fosters a system, where educational achievements can be recognized and valued not only within the country but also in the international arena, expanding opportunities and opening doors for students to pursue their aspirations on a global scale.

In response to the rapid advancements in science and technology and the evolving approaches in various domains of Food Technology and related subjects, the Board of Studies in Dept. of Food Technology and Research at TuljaramChaturchand College of Arts, Science and Commerce (Autonomous), Baramati - Pune, has developed the curriculum for the first semester of F.Y. M.Voc. Food Technology, which goes beyond traditional academic boundaries. The syllabus is aligned with the NEP 2020 guidelines to ensure that students receive an education that prepares them for the challenges and opportunities of the 21st century. This syllabus has been designed under the framework of the Choice Based Credit System (CBCS), taking into consideration the guidelines set forth by the National Education Policy (NEP) 2020, LOCF (UGC), NCrF, NHEQF, Prof. R.D. Kulkarni's Report, Government of Maharashtra's General

Resolution dated 20th April and 16th May 2023, and the Circular issued by SPPU, Pune on 31st May 2023.

A Food Technology Graduates degree equips students with the knowledge and skills necessary for a diverse range of fulfilling career paths. Food Technology graduate students find opportunities in various fields, including procurement, Testing and quality control, Processing and Production, Research and Development, Storage and Supply Chain Management, Food Regulatory Agencies, Auditing, Academics, Competitive exams, Biostatistics, Database analysis, Entrepreneurship Development, and many other food and food related organizations.

Throughout their Three-year degree program, students explore the significance of Farm to Fork processing by utilization of post -harvest technology. They learn tools, techniques, and processes which is required to set up agencies including pickles, jam and jelly, fruit processing, vegetable processing, organic product, dairy products, Animal Product processing Bakery and Confectionery products producing industries.

Overall, revising the Food Technology syllabi in accordance with the NEP 2020 ensures that students receive an education that is relevant, comprehensive, and prepares them to navigate the dynamic and interconnected world of today. It equips them with the knowledge, skills, and competencies needed to contribute meaningfully to society and pursue their academic and professional goals in a rapidly changing global landscape.

Programme Specific Outcomes (PSOs)

Programme Outcomes for Vocational (M.Voc.) Degree Programme in accordance with National Education Policy-2020 with effect from Academic Year 2023-24. Bachelor of Vocation (M.Voc.) Courses are designed to provide students with specific vocational skills and knowledge that are directly applicable to the industry or field they are studying. The programme outcomes of these courses typically focus on preparing students for employment or entrepreneurship in their chosen vocational area.

PO1-Technical Competence: Students will acquire specialized technical skills and knowledge relevant to their chosen vocation, enabling them to perform tasks effectively and efficiently in their respective industries.

PO2-Problem Solving Skills: Students will develop the ability to identify, analyze, and solve problems encountered in their vocational field, using both theoretical knowledge and practical experience.

PO3-Employability Skills: Students will gain employability skills such as communication, teamwork, leadership, adaptability, and professionalism, which are essential for success in the workplace.

PO4-Industry Relevance and entrepreneurial abilities: The students will adopt knowledge and skills that are relevant to the current needs and required practices of the industry or sector, they are entering. Students focus on fostering entrepreneurial skills, equipping students with the knowledge and capabilities to start and manage their own businesses in their chosen field.

PO5-Ethical and Social Responsibility: Students will be aware of the ethical considerations and social responsibilities associated with their vocational field, and they will be able to apply ethical principles in their professional practices.

PO6-Environmental Awareness: The students should be able to ability to apply the knowledge, skills, attitudes and values required to take appropriate action for justifying the effect of environmental degradation, climate change, pollution control, effective waste management etc.

PO7-Research and Innovations: Depending on the programme, students may develop research and innovation skills, enabling them to contribute to advancements and improvements within their vocational field.

PO8 -Global Perspective: In an increasingly interconnected world, programmes may emphasize the importance of understanding global trends, markets, and perspectives relevant to the students' vocation.

PO9-Multidisciplinary studies: Students will adopt the multidisciplinary studies in an academic approach that integrate knowledge and methodology from various discipline to provide a comprehensive understanding of related job/business opportunities.

PO10-Community Engagement: The students will be able to demonstrate the capability to participate in community-engaged services/activities for promoting the wellbeing of society

Anekant Education Society's

Tuljaram Chaturchand College, Baramati

(Autonomous)

Board of Studies(BOS) B.Voc. Food Technology & Research

Sr.No	Name of the BOS members	Designation
1.	**Dr. Wajid A. Khan** Head & Associate Professor, Department of Food Technology &Research. C. College, Baramati	Chairman
2.	**Ms. Vaibhavi A. Bhosale** Assistant Professor, Dept. of Food Tech. & ResearchT. C. College, Baramati	Internal Member
3.	**Ms. Asawari D. Katekar** Assistant Professor, Dept. of Food Tech. & ResearchT. C. College, Baramati	Internal Member
4.	**Ms. Tilotama R. Pawar** Assistant Professor, Dept. of Food Tech. & ResearchT. C. College, Baramati	Internal Member
5.	**Ms. Shreeja R. Deokar** Assistant Professor, Dept. of Food Tech. & ResearchT. C. College, Baramati	Internal Member
6.	**Ms. Gayatri T. Deshmukh** Assistant Professor, Dept of Food Tech. & ResearchT. C. College, Baramati	Internal Member
7.	**Dr. A.K. Sahoo** Professor, Dept. of Food Technology, Shivaji University, Kolhapur	External Member Expertfromother University
8.	**Dr. Rinku Agarwal** Assistant Professor, Dept. of Food Technology, MIT-ADT University	External Member Expertfromother University
9.	**Ms. Meenaz Wadgaonkar**, General Manager- Operation, Gits Food Products Pvt. Ltd., Hadapsar	External Member IndustryExpert
10.	**Mr. Sagar Salunkhe** Plant Manager, Bauli India Bakes & Sweets, MIDC, Baramati	Meritorious Alumni

Title of the Course: B. Voc. (Food Processing & Post Harvest Technology)
(To be implemented from Academic Year - 2022-2023)

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.

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

Third Year: Semester-V

Subj. Code	Subject Name	No. of Credits	Marks
Theory (General Component)			
UBFP-351	Dairy Technology	4	100
UBFP-352	Food Quality and Safety Management	4	100
UBFP-353	Principle of Post-Harvest Technology	4	100
Practical (Skill Component)			
UBFP-351-1	Dairy Technology	6	150
UBFP-351-2	Entrepreneurship Development	6	150
UBFP-351-3	Project	6	150

Third Year **Semester V**

Dairy Technology

Theory **Paper No. UBFP-351**

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.

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

Justification for mapping

PO1-Technical Competence: Students will acquire specialized technical skills and knowledge relevant to their chosen vocation, enabling them to perform tasks effectively and efficiently in their respective industries.

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.

PO2-Problem Solving Skills: Students will develop the ability to identify, analyze, and solve problems encountered in their vocational field, using both theoretical knowledge and practical experience.

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.

PO3-Employability Skills: Students will gain employability skills such as communication, teamwork, leadership, adaptability, and professionalism, which are essential for success in the workplace.

CO6: Understand about the working of various dairy equipments.

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

PO4-Industry Relevance and entrepreneurial abilities: The students will adopt knowledge and skills that are relevant to the current needs and required practices of the industry or sector, they are entering. Students focus on fostering entrepreneurial skills, equipping students with the knowledge and capabilities to start and manage their own businesses in their chosen field.

CO6: Understand about the working of various dairy equipments.

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

PO5-Ethical and Social Responsibility: Students will be aware of the ethical considerations and social responsibilities associated with their vocational field, and they will be able to apply ethical principles in their professional practices.

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

PO6-Environmental Awareness: The students should be able to ability to apply the knowledge, skills, attitudes and values required to take appropriate action for justifying the effect of environmental degradation, climate change, pollution control, effective waste management etc.

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

PO7-Research and Innovations: Depending on the programme, students may develop research and innovation skills, enabling them to contribute to advancements and improvements within their vocational field.

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.

PO9-Multidisciplinary studies: Students will adopt the multidisciplinary studies in an academic approach that integrate knowledge and methodology from various discipline to provide a comprehensive understanding of related job/business opportunities.

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.

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. Yarpar, 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

Third Year **Semester V**

Dairy Technology

PRACTICAL **Paper No. UBFP-351-1**

Maximum Marks: 150 **Credits: 6**

Teaching Period: 2/weak **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

CO/	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12

PO												
CO1	3	2	-	3	4	3	5	1	-	-	2	-
CO2	2	-	1	-	-	5	-	-	2	-	-	1
CO3	2	1	-	-	3	4	3	-	1	-	1	-
CO4	-	2	-	-	1	-	2	-	-	-	2	-
CO5	-	-	-	2	3	-	-	1	2	1	-	-
CO6	1	1	-	1	-	-	3	-	4	-	-	-
CO7	1	-	-	-	3	5	6	3	-	1	-	-

Justification for mapping

PO1-Technical Competence: Students will acquire specialized technical skills and knowledge relevant to their chosen vocation, enabling them to perform tasks effectively and efficiently in their respective industries.

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.

PO2-Problem Solving Skills: Students will develop the ability to identify, analyze, and solve problems encountered in their vocational field, using both theoretical knowledge and practical experience.

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.

PO3-Employability Skills: Students will gain employability skills such as communication, teamwork, leadership, adaptability, and professionalism, which are essential for success in the workplace.

CO6: Understand about the working of various dairy equipments.

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

PO4-Industry Relevance and entrepreneurial abilities: The students will adopt knowledge and skills that are relevant to the current needs and required practices of the industry or sector, they are entering. Students focus on fostering entrepreneurial skills, equipping students with the knowledge and capabilities to start and manage their own businesses in their chosen field.

CO6: Understand about the working of various dairy equipments.

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

PO5-Ethical and Social Responsibility: Students will be aware of the ethical considerations and social responsibilities associated with their vocational field, and they will be able to apply ethical principles in their professional practices.

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

PO6-Environmental Awareness: The students should be able to ability to apply the knowledge, skills, attitudes and values required to take appropriate action for justifying the effect of environmental degradation, climate change, pollution control, effective waste management etc.

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

PO7-Research and Innovations: Depending on the programme, students may develop research and innovation skills, enabling them to contribute to advancements and improvements within their vocational field.

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.

PO9-Multidisciplinary studies: Students will adopt the multidisciplinary studies in an academic approach that integrate knowledge and methodology from various discipline to provide a comprehensive understanding of related job/business opportunities.

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.

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

Third Year **Semester V**

Food Quality, Laws and Regulations

Theory **Paper No. UBFP-352**

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

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 mapping

PO1-Technical Competence: Students will acquire specialized technical skills and knowledge relevant to their chosen vocation, enabling them to perform tasks effectively and efficiently in their respective industries.

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.

PO2-Problem Solving Skills: Students will develop the ability to identify, analyze, and solve problems encountered in their vocational field, using both theoretical knowledge and practical experience.

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.

PO3-Employability Skills: Students will gain employability skills such as communication, teamwork, leadership, adaptability, and professionalism, which are essential for success in the workplace.

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

PO4-Industry Relevance and entrepreneurial abilities: The students will adopt knowledge and skills that are relevant to the current needs and required practices of the industry or sector, they are entering. Students focus on fostering entrepreneurial skills, equipping students with the knowledge and capabilities to start and manage their own businesses in their chosen field.
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

PO5-Ethical and Social Responsibility: Students will be aware of the ethical considerations and social responsibilities associated with their vocational field, and they will be able to apply ethical principles in their professional practices.
CO7: understand about the role and responsibilities of Quality control department of food\

PO6-Environmental Awareness: The students should be able to ability to apply the knowledge, skills, attitudes and values required to take appropriate action for justifying the effect of environmental degradation, climate change, pollution control, effective waste management etc.
CO1: Be able to critically evaluate the recent developments in the control of food safety.

CO2: Have an integrated view of the issues involved.

PO7-Research and Innovations: Depending on the programme, students may develop research and innovation skills, enabling them to contribute to advancements and improvements within their vocational field.
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.

PO9-Multidisciplinary studies: Students will adopt the multidisciplinary studies in an academic approach that integrate knowledge and methodology from various discipline to provide a comprehensive understanding of related job/business opportunities.
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.

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. Pieternel A, Luning, Willem J. Marcelis, Food Quality Management Technological and Managerial principles and practices, Wageningen,2009.

Third Year **Semester VI**

Principles of Post Harvests Technology

Theory **Paper No. UBFP-353**

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.

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	-	3	2	3	-	-	-	-	3	2	-
CO4	-	-	-	4	-	5	3	-	5	-	4	-
CO5	2	2	1	3	-	2	5	-	-	2	2	1
CO6	2	2	1	4	-	-	1	-	-	2	2	1
CO7	3	-	1	-	-	-	-	-	-	-	2	1

Justification for mapping

PO1-Technical Competence: Students will acquire specialized technical skills and knowledge relevant to their chosen vocation, enabling them to perform tasks effectively and efficiently in their respective industries.

CO4: Understand cold chain management

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

PO2-Problem Solving Skills: Students will develop the ability to identify, analyze, and solve problems encountered in their vocational field, using both theoretical knowledge and practical experience.
CO6: Understand the history and role of post-harvest technology.

CO7: Learn about the Food storage systems

PO3-Employability Skills: Students will gain employability skills such as communication, teamwork, leadership, adaptability, and professionalism, which are essential for success in the workplace.
CO6: Understand the history and role of post-harvest technology.

CO7: Learn about the Food storage systems

PO4-Industry Relevance and entrepreneurial abilities: The students will adopt knowledge and skills that are relevant to the current needs and required practices of the industry or sector, they are entering. Students focus on fostering entrepreneurial skills, equipping students with the knowledge and capabilities to start and manage their own businesses in their chosen field.
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

PO5-Ethical and Social Responsibility: Students will be aware of the ethical considerations and social responsibilities associated with their vocational field, and they will be able to apply ethical principles in their professional practices.
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.

PO6-Environmental Awareness: The students should be able to ability to apply the knowledge, skills, attitudes and values required to take appropriate action for justifying the effect of environmental degradation, climate change, pollution control, effective waste management etc.
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.

PO7-Research and Innovations: Depending on the programme, students may develop research and innovation skills, enabling them to contribute to advancements and improvements within their vocational field.
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.

PO9-Multidisciplinary studies: Students will adopt the multidisciplinary studies in an academic approach that integrate knowledge and methodology from various discipline to provide a comprehensive understanding of related job/business opportunities.

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

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

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 Vegetbales*. 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

Third Year **Semester V**

Entrepreneurship Development

PRACTICAL **Paper No. UBFP-351-2**

Maximum Marks: 150 **Credits: 6**

Teaching Period: 2/weak **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.

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 mapping

PO1-Technical Competence: Students will acquire specialized technical skills and knowledge relevant to their chosen vocation, enabling them to perform tasks effectively and efficiently in their respective industries.

CO1: Understand the importance of entrepreneurship development.

CO2: Learn about the preparation of Visit report.

CO3: Study about the develop & perform market survey format

PO2-Problem Solving Skills: Students will develop the ability to identify, analyze, and solve problems encountered in their vocational field, using both theoretical knowledge and practical experience.

CO5: Study about the Preparation of project feasibility report

CO6: Understand the Case analysis and presentations

CO7: Understand the Identification of self-employment areas.

PO3-Employability Skills: Students will gain employability skills such as communication, teamwork, leadership, adaptability, and professionalism, which are essential for success in the workplace.

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

PO4-Industry Relevance and entrepreneurial abilities: The students will adopt knowledge and skills that are relevant to the current needs and required practices of the industry or sector, they are entering. Students focus on fostering entrepreneurial skills, equipping students with the knowledge and capabilities to start and manage their own businesses in their chosen field.

CO1: Understand the importance of entrepreneurship development.

CO2: Learn about the preparation of Visit report.

CO3: Study about the develop & perform market survey format

PO5-Ethical and Social Responsibility: Students will be aware of the ethical considerations and social responsibilities associated with their vocational field, and they will be able to apply ethical principles in their professional practices.

CO6: Understand the Case analysis and presentations

CO7: Understand the Identification of self-employment areas.

PO6-Environmental Awareness: The students should be able to ability to apply the knowledge, skills, attitudes and values required to take appropriate action for justifying the effect of environmental degradation, climate change, pollution control, effective waste management etc.

CO6: Understand the Case analysis and presentations

CO7: Understand the Identification of self-employment areas.

PO7-Research and Innovations: Depending on the programme, students may develop research and innovation skills, enabling them to contribute to advancements and improvements within their vocational field.

CO5: Study about the Preparation of project feasibility report

CO6: Understand the Case analysis and presentations

PO9-Multidisciplinary studies: Students will adopt the multidisciplinary studies in an academic approach that integrate knowledge and methodology from various discipline to provide a comprehensive understanding of related job/business opportunities.

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

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

Third Year **Semester V**

Project

PRACTICAL **Paper No. UBFP-351-3**

Maximum Marks: 150 **Credits: 6**

Teaching Period: 2/weak **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.

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

CO5	**2**	**1**	**1**	**3**	**-**	**2**	**-**	**-**	**-**	**2**	**1**	**1**
CO6	**2**	**2**	**1**	**4**	**-**	**-**	**1**	**-**	**-**	**2**	**2**	**1**
CO7	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**3**	**-**	**-**

Justification for mapping

PO1-Technical Competence: Students will acquire specialized technical skills and knowledge relevant to their chosen vocation, enabling them to perform tasks effectively and efficiently in their respective industries.

CO1: understand the importance of Product Development.

CO2: learn about the new product development

CO3: Study about the perform market survey about new product

PO2-Problem Solving Skills: Students will develop the ability to identify, analyze, and solve problems encountered in their vocational field, using both theoretical knowledge and practical experience.

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.

PO3-Employability Skills: Students will gain employability skills such as communication, teamwork, leadership, adaptability, and professionalism, which are essential for success in the workplace.

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.

PO4-Industry Relevance and entrepreneurial abilities: The students will adopt knowledge and skills that are relevant to the current needs and required practices of the industry or sector, they are entering. Students focus on fostering entrepreneurial skills, equipping students with the knowledge and capabilities to start and manage their own businesses in their chosen field.

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

PO5-Ethical and Social Responsibility: Students will be aware of the ethical considerations and social responsibilities associated with their vocational field, and they will be able to apply ethical principles in their professional practices.

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.

PO6-Environmental Awareness: The students should be able to ability to apply the knowledge, skills, attitudes and values required to take appropriate action for justifying the effect of environmental degradation, climate change, pollution control, effective waste management etc.

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.

PO7-Research and Innovations: Depending on the programme, students may develop research and innovation skills, enabling them to contribute to advancements and improvements within their vocational field.

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

PO9-Multidisciplinary studies: Students will adopt the multidisciplinary studies in an academic approach that integrate knowledge and methodology from various discipline to provide a comprehensive understanding of related job/business opportunities.

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

Group of four students shall undertake project work related to design and development of innovative food product, its quality evaluation, packaging, labelling 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.