Anekant Education Society's

Tuljaram Chaturchand College, Baramati

(Autonomous)

Two Year M.Voc Degree Program in
Food Technology & Research

(Faculty of Food Technology& Research)

CBCS Syllabus

SY M.Voc (Food Technology) Semester -IV

For Department Food Technology & Research

Tuljaram Chaturchand College, Baramati

Choice Based Credit System Syllabus (2024 Pattern)

TobeimplementedfromAcademicYear2024-2025

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

From2022-23to2024-25

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

Information

1. **One semester** = 15 weeks (12 weeks actual teaching and 3 weeks for internal evaluation, tutorials, problem solutions, student's difficulty solution, etc.)
2. As per NCrF :
   - Theory course: A minimum of 15 hours of teaching per credit is required.
   - Laboratory course: A minimum of 30 hours in laboratory activities per credit is required.
3. **1-credit theory** = 15 hours i.e. for 1 credit, 1 hour per week teaching is to be performed.

   15 hours of 1-credit are splinted as 12 hours actual teaching + 3 hours Tutorial (practice problem solving sessions, repeated discussion on difficult topics, and discussion on student's difficulties, questions discussion and internal evaluation)

4. **1-credit practical** = 30 hours. Thus, 1 credit practical = 2 contact hours in laboratory per week

   30 hours splinted as 24 hours' actual table work and 6 hours for journal competition, oral on each practical and other internal evaluation.

5. **Each theory courses of any type** (Major, Minor, VSC, VEC, OE/GE, VEC, SEC, CC, etc.) **is of 2 credits**.
   a. **Theory per semester:** Contact hours = 24 teaching + 6 tutorials (problem solving sessions, repeated discussion on difficult topics, difficult solution, questions discussion and internal evaluation)
   b. Each course will be of two modules, One module = 15 hours
   c. Each module may consist of one or more than one chapter.
6. **Each practical course of any course is of 2 credits = 60 hours per semester**
   a. Minimum 12 laboratory sessions must be conducted in one semester.
   b. Each laboratory sessions should be 4 hours.
   c. If practical is short, then two short practicals should be included in one laboratory sessions.
   d. In 12 laboratory sessions maximum 2 demonstration sessions or table work sessions may be included and must be designed carefully for 4 hours' sessions.
   e. 4 hours' laboratory sessions include - performing table work (practical), calculation, writing results and conclusion, and submission of practical in written form to practical in charge.
   f. Pre-laboratory reading and post laboratory work / questions should be assigned on each practical and this will be the part of internal evaluation.
7. **Design syllabus of each theory and practical course as per above guidelines.**
   a. **Theory syllabus** should be given module wise and chapter wise.
   b. **Theory syllabus** should include name of topic, number of teaching hours allotted, detailed point wise syllabus, page numbers, references book no.
   c. It is recommended that**, design syllabus of one theory course from maximum two references books** and they will be called as main reference books/text books. Below that,

you can add names of more reference books and they will be supplementary reference books.

d. Syllabus of practical must be given practical wise. Name of experiment and aim of the experiment should be clearly mentioned. Mention reference book number or bibliography for each practical. At least 16 practicals' must be included in syllabus from which 12 practicals will be actually conducted. If practical is short, then two short practicals' will be considered as one practical.

e. At the end of syllabus of theory and practical course, a list of references book should be given number wise.

f. At the end of each theory and practical course 6 CO should be given.

A. Names of UG and PG courses related to Specialization

Important Note: For specialized subjects wherever designing of practical course is not adequate then included, theory course of 2 credits in place of practical course.

Semester	Major Courses	Major Elective Curses	Minor Curses	VSC	IKS
I	2 theory + 1 Practical			1 Theory	1 Theory
II	2 theory + 1 Practical		1 Theory + 1 Practical	1 Practical	0
III	3 theory + 1 Practical		1 Theory + 1 Practical	1 Theory	0
IV	3 theory + 1 Practical		1 Theory + 1 Practical	1 Practical	0
V	3 theory + 2 Practical	1 Theory + 1 Practical	1 Theory + 1 Practical	1 Theory	0
VI	3 theory + 2 Practical	1 Theory + 1 Practical		1 Practical	0
	VII and VIII Sem honours degree with major				
VII	5 theory + 2 Practical	1 Theory + 1 Practical	0	0	0
VIII	5 theory + 2 Practical	1 Theory + 1 Practical	0	0	0
	VII and VIII Sem honours degree with research				
VII	4 theory + 1 Practical	1 Theory + 1 Practical	0	0	0
VIII	4 theory + 1 Practical	1 Theory + 1 Practical	0	0	0

* In elective course 2T+2P are related to each other. In this case students have to choose more than 1 option i.e. in elective part, at least 2 courses each consisting of 1 theory 1 practical courses in combination.

Course Structure for S. Y. M. Voc. (Food Technology) 2023-24 to 2024-25

Level	Semester	Major		Research Methodology	OJT/FP	RP	Cum. Cr.
		Mandatory	Elective				
6.0	III	FTR-601-MJMDairy Processing Technology (T) (4 C) FTR-602-MJM - Post-Harvest technology (T) (4C)	FTR-611-MJE - Supply Chain Management (T) (2 C) **OR** FTR-611-MJE- Food Service Management (T) (2 C)		FTR-621-RP - Research Project (P)(4C)		**22 Cr.**
		FTR-603-MJM - Food Engineering (T) (2 C) FTR-604-MJM -MJM Dairy Processing Technology (P) (2 C) FTR-605-MJM - Post-Harvest technology (P) (2 C)	FTR-612-MJE - Supply Chain Management (P) (2 C) **OR** FTR-612-MJE- Food Service Management (P) (2 C)				
	IV	FTR-651-MJM -MJM-Meat Processing Technology (T) (4 C) FTR-652-MJM - Processing of Fruits & Vegetables (T) (4 C)	FTR-661-MJE - Entrepreneurship Development (T) (2 C) **OR** FTR-661-MJE- Plant Design & Layout (T) (2 C)		FTR-681-RP - Research Project (P) (4 C)		**22 Cr.**
		FTR-653-MJM- Food Safety, Quality Management (T) (2C) FTR-654-MJM - Meat Processing Technology (P) (2 C) FTR-655-MJM Processing of Fruits & Vegetables (P) (2 C)	FTR-662-MJE - Entrepreneurship Development (T) (2 C) **OR** FTR-662-MJE- Plant Design & Layout (T) (2 C)				
Cum. Cr.		**28**	**8**	**4**	**4**	**-**	**44**

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Tuljaram Chaturchand College of Arts, Science and Commerce, Baramati
(Autonomous)

CBCS Syllabus as per NEP 2020 for S.Y M.Voc. Food Technology & Research (2023 Pattern)

Name of the Programme: M.Voc. Food Technology & Research

Programme Code **:**FTR

Class **:**S.Y M.Voc.

Semester *IV*

Course Type **:**Major Mandatory

Course Code **:**FTR-651-MJM

Course Title **:** Meat Processing Technology

No. of Credits *:04*

No. of Teaching Hours 60

Learning Objectives:

- To understand need and importance of livestock, egg, Fish and poultry industry
- To study structure, composition and nutritional quality of animal products.
- To study processing and preservation of animal foods.
- To understand technology behind preparation of various animal food products and by-product utilization.
- To learn about the slaughter house by product utilization and waste management.
- To study about the pre and post slaughter operations.

Course Outcomes:

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

CO1: Explain the composition, structure and function of meat, eggs, milk and fish;
CO2: Identify and describe the physical and biochemical changes occurring during the conversion of muscle to meat;
CO3: Describe and evaluate the implication of storage and processing operations on the quality of selected foods of animal origin;

CO4: Collect and interpret the data of experiments on the effect of processing conditions on quality parameters of animal food products;
CO5: Identify and explain the product composition, quality and production process of commercially available selected animal food products.
CO6: Study about the pre and post slaughter operations.
CO7: Learn about the slaughter house by product utilization and waste management.

Topics and Learning Points

Unit I: Introduction to Meat technology 10 P

Sources of meat and meat products in India, scope of meat chicken and seafood processing, terminologies related to meat, chemical composition and microscopic structure of meat, slaughtering of animals, inspection and grading of meat

Factors affecting post mortem changes, properties and shelf life of meat, meat quality, meat refrigeration, evaluation, mechanical deboning, tenderization, aging, pickling and smokingof meat, meat plant sanitation, meat based value added products

Unit II: Poultry 10 P

Poultry classification, composition, preservation and processing - slaughtering, stunning methods, ante-mortem handling, cuts

Unit III: Egg 10 P

Structure, composition, nutritive value and functional properties of egg, preservative by differentmethods, processing of egg products, factors affecting quality of egg

Unit IV: Fisheries 10 P

Introduction to fisheries, Composition and Nutritive value of fish, types of fish, composition, structure, post-mortem changes, handling, canning, smoking, salting, dehydration and icing and preparation

Unit-V: 10P

Introduction of Animal By product: Need & Importance of by product processing, handling & utilization of skin, intestine, glands and fallen animals
By-product processing plants: By-product processing plant layout, rendering & poultryby products and utilization of bone, blood, hoof, horn, wool and hair.

Unit-V: **Waste disposal of slaughter house** 10P

Utilization & disposal of organic waste from slaughterhouse andeffluent treatment

References:

1. Manay S.N. and Shadaksharaswamy M. (2001); Food facts and principles, 2nd edn, New Age International (P) limited publishers.

2. Potter N. N. and Hotchkiss J.H. (1966); Food Science, 5th edn., CBS Publishers and distributors.
3. Y.H. Huiet at (2001) Meat Science & Applications, Marcel Dekker Inc.
4. NIIR Board; Preservation of Meat and Poultry Products, 1st, Asia Pacific Business Press Inc.
5. Stadelman W.J. and Cotterill O.J. (1973); Egg Science & Technology, 1st, The AVI Publishing Company, Inc.

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

Justification for the 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: Explain the composition, structure and function of meat, eggs, milk and fish;
CO3: Describe and evaluate the implication of storage and processing operations on the quality of selected foods of animal origin;
CO5: Identify and explain the product composition, quality and production process of commercially available selected animal food products.
CO6: Study about the pre and post slaughter operations.

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.
CO2: Identify and describe the physical and biochemical changes occurring during the conversion of muscle to meat;

PO3-Employability Skills: Students will gain employability skills such as communication, teamwork, leadership, adaptability, and professionalism, which are essential for success in the workplace.
CO1: Explain the composition, structure and function of meat, eggs, milk and fish;
CO2: Identify and describe the physical and biochemical changes occurring during the conversion of muscle to meat;
CO6: Study about the pre and post slaughter operations.
CO7: Learn about the slaughter house by product utilization and waste management.

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: Describe and evaluate the implication of storage and processing operations on the quality of selected foods of animal origin;
CO4: Collect and interpret the data of experiments on the effect of processing conditions on quality parameters of animal food products;
CO7: Learn about the slaughter house by product utilization and waste 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.
CO1: Explain the composition, structure and function of meat, eggs, milk and fish;
CO2: Identify and describe the physical and biochemical changes occurring during the conversion of muscle to meat;
CO3: Describe and evaluate the implication of storage and processing operations on the quality of selected foods of animal origin;
CO5: Identify and explain the product composition, quality and production process of commercially available selected animal food products.
CO7: Learn about the slaughter house by product utilization and waste management.

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: Explain the composition, structure and function of meat, eggs, milk and fish;
CO3: Describe and evaluate the implication of storage and processing operations on the quality of selected foods of animal origin;
CO6: Study about the pre and post slaughter operations.
CO7: Learn about the slaughter house by product utilization and waste management.

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: Explain the composition, structure and function of meat, eggs, milk and fish;
CO3: Describe and evaluate the implication of storage and processing operations on the quality of selected foods of animal origin;
CO5: Identify and explain the product composition, quality and production process of commercially available selected animal food products.
CO7: Learn about the slaughter house by product utilization and waste management.

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.
CO1: Explain the composition, structure and function of meat, eggs, milk and fish;
CO3: Describe and evaluate the implication of storage and processing operations on the quality of selected foods of animal origin;
CO6: Study about the pre and post slaughter operations.
CO7: Learn about the slaughter house by product utilization and waste management.

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.
CO4: Collect and interpret the data of experiments on the effect of processing conditions on quality parameters of animal food products;
CO6: Study about the pre and post slaughter operations.

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
CO1: Explain the composition, structure and function of meat, eggs, milk and fish;
CO3: Describe and evaluate the implication of storage and processing operations on the quality of selected foods of animal origin;
CO5: Identify and explain the product composition, quality and production process of commercially available selected animal food products.
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CBCS Syllabus as per NEP 2020 for S.Y M.Voc. Food Technology & Research (2023 Pattern)

Name of the Programme:M.Voc. Food Technology & Research

Programme Code **:**FTR

Class **:**S.Y M.Voc.

Semester *IV*

Course Type **:** Major Mandatory

Course Code **:** FTR-652-MJM

Course Title **: Processing of Fruit and Vegetable**

No. of Credits *: 04*

No. of Teaching Hours 60

Learning Objective:

- To impart knowledge of different methods of fruits and vegetable processing.
- To learn about nutritional importance of fruits, vegetable and plantation crops
- To learn about processing of various spices, tea, coffee and cocoa.
- To develop the skills of various postharvest technologies and processing of food after postharvest
- To study preservation of fruits, vegetables and plantation crops
- To study various processed product, their preparation and storage methods.

Course Outcomes:

CO1: Students will have a thorough understanding of various food processing techniques.
CO2: The students will know the importance of various preservation techniques.
CO3: The students will know about nutritional importance of fruits, vegetable and plantation crops
CO4: The students will knowQuality Control and Waste Utilization in fruits & vegetables
CO5: The students will know various postharvest technologies and processing of food after postharvest
CO6: The students will know preservation of fruits, vegetables and plantation crops
CO7: The students will know various processed product, their preparation and storage methods

Topics and Learning Points

Unit 1: Introduction to Fruit and Vegetable Processing **10 P**

Fruit and vegetable processing industry in India, Importance, Status of fruit and vegetable processing industry and fruit product orders. Climacteric and Non-climacteric fruits, Poly-nutrients in fruits and vegetables, ripening process, handling, transportation, controlled atmosphere ripening process, modified atmosphere packaging.

Unit 2: Canning, Freezing and Dehydration of Fruits and Vegetables **10 P**

Process of Canning, Equipments used in canning, Process of Freezing, Equipments used and problems associated with specific fruits and Vegetable, Dehydration- Pre-processing methods, Osmotic dehydration, Indian Food Regulations and Quality assurance

Unit 3: Fruit and Vegetable Products **10 P**

Fruit Beverages, Jam, Jelly, Marmalade, preserve, candied and crystallized fruits and vegetables, pickles, chutney, sauces/Ketchups, Nectar, Cordials, Fruit Cheese, Potato products and Pectin.

Unit-4 Quality Control and Waste Utilization **10P**

Quality Characteristics of Fruits and Vegetable for Processing, Quality Control in Food Processing Industry, utilization of Fruit and Vegetable waste, water for Fruit and Vegetable Processing Industries.

Unit-5: Spices and essential oil **12 P**

Processing and properties of major and minor spices, essential oils & oleoresins.

Unit-6: Tea, coffee and cocoa processing **8 P**

Tea, coffee and cocoa processing.

References:

1. Haid, N.F. and S.K. Salakahe.1997. Post -harvest physiology and hardening of fruits andvegetables. Greada Publication, London.
2. Chadha, K .L. and O. P. Pareek, 1996. Advances in horticulture. MalhotraPublishers,New Delhi. 1997.
3. Pandey, P. H. Post- harvest technology of fruits and vegetables 1997. Technicalpublishers of India, Allahabad.
4. Jacob John, P., 2008. A Handbook on postharvest management of fruits and
5. Joseph, J. Jen. 1989. Quality factors of fruits and vegetables. Chemistry and technology 1989. American Chemical Society, Washington.

Pandey, P. H. 1998. Principles and practices of post -harvest technology.KalyaniPublishers, New Delhi

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

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: Able to get knowledge about working of fruit & vegetable processing industry.

CO3: Learn about the working of various equipments used in fruit & vegetable industry.

CO5: Understand about the formulation of different fruit & vegetable products.

CO6: Able to get knowledge about process of different carbonated &non-carbonated beverages.

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.

CO2: Study about processing of different fruit products in food industry

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

CO1: Student will able to get knowledge about working of fruit & vegetable processing industry.

CO2: Student will Study about processing of different fruit products in food industry and their health benefits.

CO6: Able to get knowledge about process of different carbonated &non-carbonated beverages.

CO7: Study about processing of different vegetable products in food industry.

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: Learn about the working of various equipments used in fruit & vegetable industry and their working.

CO5: Understand about the formulation of different fruit & vegetable products.

CO6: Able to get knowledge about process of different carbonated &non-carbonated beverages and their health benefits.

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.

CO1: Student will able to get knowledge about working of fruit & vegetable processing industry.

CO2: Student will Study about processing of different fruit products in food industry and their health benefits.

CO3: Learn about the working of various equipments used in fruit & vegetable industry and their working.

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CO7: Study about processing of different vegetable products in food industry.

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: Student will able to get knowledge about working of fruit & vegetable processing industry.

CO3: Learn about the working of various equipments used in fruit & vegetable industry and their working.

CO6: Able to get knowledge about process of different carbonated &non-carbonated beverages and their health benefits.

CO7: Study about processing of different vegetable products in food industry

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: Student will able to get knowledge about working of fruit & vegetable processing industry.

CO3: Learn about the working of various equipments used in fruit & vegetable industry and their working.

CO5: Understand about the formulation of different fruit & vegetable products.

CO7: Study about processing of different vegetable products in food industry

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.

CO1: Student will able to get knowledge about working of fruit & vegetable processing industry.

CO3: Learn about the working of various equipments used in fruit & vegetable industry and their working.

CO6: Able to get knowledge about process of different carbonated &non-carbonated beverages and their health benefits.

CO7: Study about processing of different vegetable products in food industry

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.

CO4: Student will able to Know about the adulteration of spices and their effect on food.

CO6: Able to get knowledge about process of different carbonated &non-carbonated beverages and their health benefits.

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

CO1: Able to get knowledge about working of fruit & vegetable processing industry.

CO3: Learn about the working of various equipments used in fruit & vegetable industry.

CO5: Understand about the formulation of different fruit & vegetable products.

CO6: Able to get knowledge about process of different carbonated &non-carbonated beverages.

CBCS Syllabus as per NEP 2020 for S.Y M.Voc. Food Technology & Research (2023 Pattern)

Name of the Programme: M.Voc. Food Technology & Research

Programme Code **:**FTR

Class **:**S.Y M.Voc.

Semester *IV*

Course Type **:**Major Mandatory

Course Code **:**FTR-653-MJM

Course Title **: Food Safety and Quality Management**

No. of Credits *:02*

No. of Teaching Hours 30

Learning Objectives:

Learning Objectives

To understand the following:

- Food safety, hygiene and sanitation
- Industrial waste utilization
- Design and implementation of food safety management systems such as ISO series, HACCP and its prerequisites such as GMP, GHP etc.
- Study about the factors affecting food safety
- Learn about the importance of Importance of Safe Foods.
- Understand about the Control methods using physical and chemical agents

Course Outcomes:

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

CO1: Identify food safety hazards and their control
CO2: Identify & prevent potential sources of food contamination
CO3: Apply the principles of Hazard Analysis Critical Control Points (HACCP)
CO4: Recognize the principal legal responsibilities of food handlers regarding personal hygiene
CO5: Apply a range of food quality systems
CO6: Prepare a food safety plan
CO7: Study about the factors affecting food safety

Topics and Learning Points

Unit I: Food safety: Overview **7 P**
Importance of food safety, Food quality attributes, Factors affecting food safety

Unit II: Food quality management **82 P**
Food quality management systems, HACCP: Principles, examples, Application of HACCP in field level

Unit III: Good manufacturing practices (GMP) **8P**
personal cleanliness, buildings and facilities, sanitary operations, sanitary facilities and

controls. Equipment and utensils, production and process control, warehousing and distribution, traceability and recall

Unit IV: Food Safety Management Systems (FSMS) **7P**

ISO, Codex Alimentarius Commission (CAC) guidelines for food quality management

References:

1. CAC (Codex Alimentarius Commission). 2007. Codex Alimentarius Commission – Procedural manual. Joint FAO/WHO Food Standards Programme. FAO, Rome, Italy.
2. James SJ, and James C (2010) Advances in the cold chain to improve food safety, food qualityand the food supply chain. In: Mena C, Stevens G (Eds) Delivering performance in food supplychains.

CBCS Syllabus as per NEP 2020 for S.Y M.Voc. Food Technology & Research (2023 Pattern)

Name of the Programme: M.Voc. Food Technology & Research

Programme Code **:** FTR

Class **:**S.Y M.Voc.

Semester *IV*

Course Type **:** Major Mandatory

Course Code **:**FTR-654-MJM

Course Title : Meat Processing Technology

No. of Credits *:02*

No. of Teaching Hours 30

Learning Objectives:

- To understand need and importance of livestock, egg, Fish and poultry industry
- To study structure, composition and nutritional quality of animal products.
- To study processing and preservation of animal foods.
- To understand technology behind preparation of various animal food products and by-product utilization.
- To study about waste management of slaughter house.
- To learn about antimortem inspection

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

CO1: Explain the composition, structure and function of meat, eggs, milk and fish;
CO2: Identify and describe the physical and biochemical changes occurring during the conversion of muscle to meat;
CO3: Describe and evaluate the implication of storage and processing operations on the quality of selected foods of animal origin;
CO4: Collect and interpret the data of experiments on the effect of processing conditions on quality parameters of animal food products;
CO5: Identify and explain the product composition, quality and production process of commercially available selected animal food products.
CO6: Study about waste management of slaughter house.
CO7: Learn about antimortem inspection

1. Estimation of moisture content of meat
2. Estimation of protein content of meat by Micro-kjedahl Method
3. To study shelf-life of the eggs.
4. Candling and grading of eggs
5. To study the canning of meat.
6. Egg pickle production.
7. To the study the slaughtering of Animals
8. Determination of physico-chemical quality of meat and meat products.
9. Introduction to the product formulation.
10. Quality evaluation of fish and prawns.

References:

1. Manay S.N. and Shadaksharaswamy M. (2001); Food facts and principles, 2nd edn, New Age International (P) limited publishers.
2. Potter N. N. and Hotchkiss J.H. (1966); Food Science, 5th edn., CBS Publishers and distributors.
3. Y.H. Huiet at (2001) Meat Science & Applications, Marcel Dekker Inc.
4. NIIR Board; Preservation of Meat and Poultry Products, 1st, Asia Pacific Business Press Inc.
5. Stadelman W.J. and Cotterill O.J. (1973); Egg Science & Technology, 1st, The AVI Publishing Company, Inc.

CBCS Syllabus as per NEP 2020 for S.Y M.Voc. Food Technology & Research (2023 Pattern)

Name of the Programme: M.Voc. Food Technology & Research

Programme Code **:** FTR

Class **:** S.Y M.Voc.

Semester *IV*

Course Type **:**Major Mandatory

Course Code **:** FTR-655-MJM

Course Title **Processing of Fruit and Vegetable**

No. of Teaching Hours 30

Learning Objectives:

- To impart knowledge of different methods of fruits and vegetable processing.
- To learn about nutritional importance of fruits, vegetable and plantation crops
- To learn about processing of various spices, tea, coffee and cocoa.
- To develop the skills of various postharvest technologies and processing of food after postharvest
- To study preservation of fruits, vegetables and plantation crops
- To study various processed product, their preparation and storage methods.

Course Outcomes:

CO1: Students will have a thorough understanding of various food processing techniques.
CO2: The students will know the importance of various preservation techniques.
CO3: The students will know about nutritional importance of fruits, vegetable and plantation crops
CO4: The students will knowQuality Control and Waste Utilization in fruits & vegetables
CO5: The students will know various postharvest technologies and processing of food after postharvest
CO6: The students will know preservation of fruits, vegetables and plantation crops
CO7: The students will know various processed product, their preparation and storage methods

Topics and Learning Points

1. Maturity analysis of Fruits 1P
2. Preparation of Fruit Beverages 7P
   a. Juice
   b. RTS
   c. Squash
   d. Syrup

e. Cordial
f. Nectar
g. Wine

3. Preparation of Mixed Fruit Jam 1P
4. Preparation of Jelly 1P
5. Preparation of Fruit Cheese 1P
6. Preparation of Fruit Butter 1P
7. Preparation of Fruit Juice Powder 1P
8. Vegetable Pickle Preparation 2P
9. Preparation of Tomato Products 2P
   a. Ketchup/Sauce
   b. Tomato Soup
10. Preparation of Fruit Juice Powder 2P
11. Preparation of Potato Products 2P
    a. Potato Wafers/chips
    b. French Fries
12. Canning of fruits and vegetables 2P
13. Adulteration of spices 2P
14. Visit to Industry 3P
15. Preparation of Report on Industrial Visit 2P

References:

1. Subbulakshi G ,Udapi shobha A, (2001) ,food processing and preservation , New age international (P) limited , publisher
2. Srivastava R.P, Kumar Sanjeev (1994) ,Fruits and vegetable preservation , first edition, International book distributing co.
3. S. Rangnna (1977) ,Handbook of Analysis and quality control for fruit and vegetable products (second edition) ,Tata Mcgraw –hill publishing co. limited
4. Loesecke H.W.V. (2005), Drying and dehydration of foods, Updesh purohit for agrobios (India) jodhpur.
5. S. Saraswathy , T.L.preethi , S.Balsubramanyan , J.suresh ,N. Revanthy and S. naarajan (2008) : Post harvest Management of Horticulture Crops , Dr, Updesh
6. Purohit for Agrobios (India) Jodhpur Salunkhe D.K, Kadam S.S(2005) ,Handbook of fruit science and technology ,Marcel dekker, Inc.
7. Bose T.k ,Mitra S.K ,Sanyal D (2001) , Fruits : Tropical and subtropical (vol .1), Third edition ,Partha sankar basu naya udyog.
8. Bhatiya Vijaya (2004),Preservation of fruit and vegetables, 2nd edition, Kalyani publishers

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

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

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: Able to get knowledge about working of fruit & vegetable processing industry.

CO3: Learn about the working of various equipments used in fruit & vegetable industry.

CO5: Understand about the formulation of different fruit & vegetable products.

CO6: Able to get knowledge about process of different carbonated &non-carbonated beverages.

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.

CO2: Study about processing of different fruit products in food industry

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

CO1: Student will able to get knowledge about working of fruit & vegetable processing industry.

CO2: Student will Study about processing of different fruit products in food industry and their health benefits.

CO6: Able to get knowledge about process of different carbonated &non-carbonated beverages.

CO7: Study about processing of different vegetable products in food industry.

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: Learn about the working of various equipments used in fruit & vegetable industry and their working.

CO5: Understand about the formulation of different fruit & vegetable products.

CO6: Able to get knowledge about process of different carbonated &non-carbonated beverages and their health benefits.

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.

CO1: Student will able to get knowledge about working of fruit & vegetable processing industry.

CO2: Student will Study about processing of different fruit products in food industry and their health benefits.
CO3: Learn about the working of various equipments used in fruit & vegetable industry and their working.
CO5: Understand about the formulation of different fruit & vegetable products.
CO7: Study about processing of different vegetable products in food industry.

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: Student will able to get knowledge about working of fruit & vegetable processing industry.
CO3: Learn about the working of various equipments used in fruit & vegetable industry and their working.
CO6: Able to get knowledge about process of different carbonated &non-carbonated beverages and their health benefits.
CO7: Study about processing of different vegetable products in food industry

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: Student will able to get knowledge about working of fruit & vegetable processing industry.
CO3: Learn about the working of various equipments used in fruit & vegetable industry and their working.
CO5: Understand about the formulation of different fruit & vegetable products.
CO7: Study about processing of different vegetable products in food industry

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.
CO1: Student will able to get knowledge about working of fruit & vegetable processing industry.
CO3: Learn about the working of various equipments used in fruit & vegetable industry and their working.
CO6: Able to get knowledge about process of different carbonated &non-carbonated beverages and their health benefits.
CO7: Study about processing of different vegetable products in food industry

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.
CO4: Student will able to Know about the adulteration of spices and their effect on food.

CO6: Able to get knowledge about process of different carbonated &non-carbonated beverages and their health benefits.

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
CO1: Able to get knowledge about working of fruit & vegetable processing industry.
CO3: Learn about the working of various equipments used in fruit & vegetable industry.
CO5: Understand about the formulation of different fruit & vegetable products.
CO6: Able to get knowledge about process of different carbonated &non-carbonated beverages.

CBCS Syllabus as per NEP 2020 for S.Y M.Voc. Food Technology & Research (2023 Pattern)

Name of the Programme: M.Voc. Food Technology & Research

Programme Code **:** FTR

Class **:** S.Y M.Voc.

Semester *: IV*

Course Type **:** Major Elective

Course Code **:** FTR-661-MJE

Course Title **:** **Plant Design and Layout**

No. of Credits : 02

Learning Objectives:

No. of Teaching Hours **:** 30

- To know about importance of study of plant layout in the food industry
- To study about the quantitative and qualitative techniques
- To study about the importance of plant design in the food industry
- To understand the comparative rating of product ideas
- To understand the types of plant models used in plant layout
- To learn about site management in food industry

Course Outcome:
CO1: Students will have a thorough understanding comparative rating of product ideas
CO2: The students will know about importance of study of plant layout in the food industry **CO3:** The students will know qualitative and quantitative techniques used in plant layout
CO4: The students will know types of plant models used in plant layout

CO5: The students will know the plant location selection
CO6: The students will know the importance of plant design in the food industry
CO7: The students will know the site management in food industry

Topics and Learning Points

Unit-1: Introduction of food plant design and layout **7P**

- Introduction to plant design, situations, difference and considerations
- Food plant design process
- Introduction to feasibility study and analysis

Unit-2: Food plant layout Introduction, Planning and Experimentation **8P**

- Plant Layout
- Layout Design Procedure
- Experimentation in Pilot Plant

Unit-3: Location and site selection, Food plant size, utilities and services **8P**

- Introduction to plant location
- Food plant size and utilities
- .Illumination and Ventilation

7P

Unit-4: Symbols used for food plant design and layout

- Symbols used for food plant design and layout
- Food processing enterprise

References:

Food Processing Plant Design & Layout Written by Mr. A. K. Sharma

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

Justification for the 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: Students will have a thorough understanding comparative rating of product ideas
CO2: The students will know about importance of study of plant layout in the food industry
CO4: The students will know types of plant models used in plant layout
CO6: The students will know the importance of plant design in the food industry

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.
CO2: The students will know about importance of study of plant layout in the food industry **CO3:** The students will know qualitative and quantitative techniques used in plant layout

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: The students will know types of plant models used in plant layout
CO7: The students will know the site management in food industry

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: The students will know qualitative and quantitative techniques used in plant layout
CO5: The students will know the plant location selection
CO6: The students will know the importance of plant design in the food industry
CO7: The students will know the site management in food industry

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.
CO3: The students will know qualitative and quantitative techniques used in plant layout
CO7: The students will know the site management in food industry

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.
CO2: The students will know about importance of study of plant layout in the food industry
CO5: The students will know the plant location selection
CO6: The students will know the importance of plant design in the food industry
CO7: The students will know the site management in food industry

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.
CO4: The students will know types of plant models used in plant layout
CO5: The students will know the plant location selection
CO6: The students will know the importance of plant design in the food industry

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.
CO3: The students will know qualitative and quantitative techniques used in plant layout
CO7: The students will know the site management in food industry

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: Students will have a thorough understanding comparative rating of product ideas
CO7: The students will know the site management in food industry

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
CO1: Students will have a thorough understanding comparative rating of product ideas
CO2: The students will know about importance of study of plant layout in the food industry
CO4: The students will know types of plant models used in plant layout
CO6: The students will know the importance of plant design in the food industry

CBCS Syllabus as per NEP 2020 for S.Y M.Voc. Food Technology & Research (2023 Pattern)

Name of the Programme: M.Voc. Food Technology & Research

Programme Code **:** FTR

Class **:** S.Y M.Voc.

Semester *IV*

Course Type **:** Major Elective

Course Code **:** FTR-661-MJE

Course Title **: Entrepreneurship Development**

No. of Credits *:02*

No. of Teaching Hours 30

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.

Topics and Learning Points

Unit I Introduction **8P**

Concept of Entrepreneurship; Role of entrepreneurship in economic development; Factors impacting emergence of entrepreneurship; Types of entrepreneurs; Characteristic of successful entrepreneurs. Entrepreneurship Development and Leadership: Types of startups; Entrepreneurial training; Entrepreneurship Development Programmes; Characteristics of entrepreneurial leadership, Components of entrepreneurial leadership

Unit II Identification of Investment Opportunities **7P**

Project ideas generation and screening. Phases in Project Management, Project feasibility study, Appraisal criteria and process; Methods of appraisal under certainty, uncertainty and risk.

Unit III Market and Demand Analysis **8P**

Sources of information – primary and secondary; Demand forecasting and market planning; Technical analysis: Materials and inputs; Production technology; Product mix; Plant location and layout; Selection of plant and equipment.

Unit IV Financial Analysis **7P**

Cost of project and means of financing; Major cost components; Planning capital structure; Financing schemes of financial institutions.

References:

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

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

Justification for the 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.

CO2: Learn about the preparation of Visit report.

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

CO5: Study about the Preparation of project feasibility report

CO6: Understand the Case analysis and presentations

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.

CO2: Learn about the preparation of Visit report.

CO5: Study about the Preparation of project feasibility report

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

CO1: Understand the importance of entrepreneurship development.

CO2: Learn about the preparation of Visit report.

CO6: Understand the Case analysis and presentations

CO7: Understand the Identification of self-employment areas.

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 develop& perform market survey format.

CO4: Learn about to set goals to become successful entrepreneur

CO6: Understand the Case analysis and presentations

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.

CO1: Understand the importance of entrepreneurship development.

CO2: Learn about the preparation of Visit report.

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

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.

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

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: Understand the importance of entrepreneurship development.

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

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.

CO1: Understand the importance of entrepreneurship development.

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

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.

CO5: Study about the Preparation of project feasibility report

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

CO2: Learn about the preparation of Visit report.

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

CO5: Study about the Preparation of project feasibility report

CO6: Understand the Case analysis and presentations

CBCS Syllabus as per NEP 2020 for S.Y M.Voc. Food Technology & Research (2023 Pattern)

Name of the Programme: M.Voc. Food Technology & Research

Programme Code **:** FTR

Class **:** S.Y M.Voc.

Semester *IV*

Course Type **:** MajorElective

Course Code **:** FTR-662-MJE

Course Title **:Plant Design and Layout**

No. of Credits *:02*

No. of Teaching Hours 30

Learning Objectives:

- To know about importance of study of plant layout in the food industry
- To study about the quantitative and qualitative techniques
- To study about the importance of plant design in the food industry
- To understand the comparative rating of product ideas
- To understand the types of plant models used in plant layout
- To learn about site management in food industry

Course Outcomes:

CO1: Students will have a thorough understanding comparative rating of product ideas
CO2: The students will know about importance of study of plant layout in the food industry **CO3:** The students will know qualitative and quantitative techniques used in plant layout
CO4: The students will know types of plant models used in plant layout
CO5: The students will know the plant location selection
CO6: The students will know the importance of plant design in the food industry
CO7: The students will know the site management in food industry

1. To study the difference between in food processing and non- food processing plant layout design.
2. To study the types of plant layout.
3. To study the methods of piant and factory layout.
4. To study the preventive and breakdown maintenance.
5. To study about comparative rating of product ideas.
6. To study the pre-feasibility stage of product processing.
7. To study the factors involved in the plant location decision
8. To study the site selection of plant layout.
9. To study the quantitative and qualitative techniques used in plant layout.
10. To study the food plant utilities.
11. To study the plant size and its factors.
12. To study the case study of plant layout
13. To study the case study of plant design.
14. To make model of any food processing industry plant layout.
15. Study visit to food processing plant and submit its report

References:

Food Processing Plant Design & Layout Written by Mr. A. K. Sharma

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

Justification for the 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: Students will have a thorough understanding comparative rating of product ideas
CO2: The students will know about importance of study of plant layout in the food industry
CO4: The students will know types of plant models used in plant layout
CO6: The students will know the importance of plant design in the food industry

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.
CO2: The students will know about importance of study of plant layout in the food industry **CO3:** The students will know qualitative and quantitative techniques used in plant layout

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: The students will know types of plant models used in plant layout
CO7: The students will know the site management in food industry

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: The students will know qualitative and quantitative techniques used in plant layout
CO5: The students will know the plant location selection
CO6: The students will know the importance of plant design in the food industry
CO7: The students will know the site management in food industry

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.
CO3: The students will know qualitative and quantitative techniques used in plant layout
CO7: The students will know the site management in food industry

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.
CO2: The students will know about importance of study of plant layout in the food industry
CO5: The students will know the plant location selection
CO6: The students will know the importance of plant design in the food industry
CO7: The students will know the site management in food industry

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.
CO4: The students will know types of plant models used in plant layout
CO5: The students will know the plant location selection
CO6: The students will know the importance of plant design in the food industry

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.
CO3: The students will know qualitative and quantitative techniques used in plant layout
CO7: The students will know the site management in food industry

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: Students will have a thorough understanding comparative rating of product ideas
CO7: The students will know the site management in food industry

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
CO1: Students will have a thorough understanding comparative rating of product ideas
CO2: The students will know about importance of study of plant layout in the food industry
CO4: The students will know types of plant models used in plant layout
CO6: The students will know the importance of plant design in the food industry

CBCS Syllabus as per NEP 2020 for S.Y M.Voc. Food Technology & Research (2023 Pattern)

Name of the Programme: M.Voc. Food Technology & Research

Programme Code **:** FTR

Class **:** S.Y M.Voc.

Semester *IV*

Course Type **:** MajorElective

Course Code **:** FTR-662-MJE

Course Title **:** Entrepreneurship Development

No. of Credits *:02*

No. of Teaching Hours 30

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 Outcome:

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.

Topics and Learning Points

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.

Reference:

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

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

Justification for the 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.

CO2: Learn about the preparation of Visit report.

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

CO5: Study about the Preparation of project feasibility report

CO6: Understand the Case analysis and presentations

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.

CO2: Learn about the preparation of Visit report.

CO5: Study about the Preparation of project feasibility report

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

CO1: Understand the importance of entrepreneurship development.

CO2: Learn about the preparation of Visit report.

CO6: Understand the Case analysis and presentations

CO7: Understand the Identification of self-employment areas.

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 develop& perform market survey format.

CO4: Learn about to set goals to become successful entrepreneur

CO6: Understand the Case analysis and presentations

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.

CO1: Understand the importance of entrepreneurship development.

CO2: Learn about the preparation of Visit report.

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

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.

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

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: Understand the importance of entrepreneurship development.

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

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.

CO1: Understand the importance of entrepreneurship development.

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

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.

CO5: Study about the Preparation of project feasibility report

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

CO2: Learn about the preparation of Visit report.

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

CO5: Study about the Preparation of project feasibility report

CO6: Understand the Case analysis and presentations

CBCS Syllabus as per NEP 2020 for S.Y M.Voc. Food Technology & Research (2023 Pattern)

Name of the Programme: M.Voc. Food Technology & Research

Programme Code **:** FTR

Class **:** S.Y M.Voc.

Semester *IV*

Course Type **:** Research Project

Course Code **:** FTR-681-RP

Course Title **:** Research Project

No. of Credits *:04*

No. of Teaching Hours 60

Learning Objectives:

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

Course Outcomes:

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

Topics and Learning Points

The research project shall consist of a report on any research work or a comprehensive and critical review of recent development in the subject or detailed report of the project work consisting of a design and / or development work being carried out by the candidate. The report must include comprehensive literature work. The examinee shall submit the research project in five copies to the head of the department duly certified by the guide, head of department and the Principal that the work has been satisfactorily completed. If candidates performed work in other institute, they have to submit separate copies of dissertation as per the requirement to the institute.

Term work:

The research project will be assessed by examination panel with two with minimum two examiners (External Examiners and senior faculty member from the department).

Viva-Voce:

It shall consist of a PPT presentation by the examinee on his work in the presence of examination panels.

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

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

Justification for the 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.

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

CO5: Study about the Preparation of project report

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

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.

CO2: learn about the new product development

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

CO1: understand the importance of Product Development.

CO2: learn about the new product development

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.

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CO5: Study about the Preparation of project report

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

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CO1: understand the importance of Product Development.

CO2: learn about the new product development

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

CO5: Study about the Preparation of project report

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.

CO1: understand the importance of Product Development.

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

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.

CO1: understand the importance of Product Development.

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

CO5: Study about the Preparation of project report

CO7: understand the process of launching a new product

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.

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