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

SY B.Voc (Food Processing & Post Harvest Technology) Semester –III

For Department Food Technology & Research

Tuljaram Chaturchand College, Baramati

Choice Based Credit System Syllabus (2025 Pattern)

(As Per NEP 2020)

To be implemented from Academic Year 2026-2027

Title of the Programme : SY B.Voc (Food Processing & Post Harvest Technology)

Preamble

AES's, Tuljaram Chaturchand 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 Tuljaram Chaturchand College of Arts, Science and Commerce (Autonomous), Baramati - Pune, has developed the curriculum for the first semester of F.Y. B.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 (B.Voc.) Degree Programme in accordance with National Education Policy-2020 with effect from Academic Year 2023-24. Bachelor of Vocation (B.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. Pallavi A. Bhosale** Assistant Professor, Department of Food Technology & Research. C. College, Baramati	Member
3.	**Ms. Shreeja R.Deokar** Assistant Professor, Department of Food Technology & Research. C. College, Baramati	Member
4.	**Ms. Soudamini R. Shinde** Assistant Professor, Department of Food Technology & Research. C. College, Baramati	Member
5.	**Ms. Vaishnavi A. Gaikwad** Assistant Professor, Department of Food Technology & Research. C. College, Baramati	Member
6.	**Ms. Prajkta A.Gawade** Assistant Professor, Department of Food Technology & Research. C. College, Baramati	Member
7.	**Ms. Aarti Dongare** Assistant Professor, M.Sc. Food Science & Technology	Vice-Chancellor Nominee Subject Expert from SPPU, Pune
8.	**Mr. Gatade Abhijeet** Assistant Professor, Shivaji University, Kolhapur	Subject Expert from Outside the Parent University
9.	**Mr. Pathan Fayaz L.** Associate Professor, MIT-ADT University	Subject Expert from Outside the Parent University
10.	**Mr. Gawate Dadasaheb** Director, Di-Roma Ice-cream, Ahmad Nagar	Representative from industry/corporate sector/allied areas
11.	**Mr. Vairagal Dnyaneshwar** Schreiber Dynamix Pvt. Ltd. Baramati	Member of the College Alumni
12.	**Ms. Vhora Payal**	UG Student
13.	**Ms. Pawar Amruta**	PG Student

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.

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Course & Credit Structure for (S.Y. B.Voc. Food Processing & Post Harvest Technology) (2025 Pattern as per NEP-2020

Sem	Course Type	Course Code	Course Name	Theory/ Practical	Credits
III	Major Mandatory	FTR-201-MRM	Food Chemistry	Theory	02
		FTR-202-MRM	Food Engineering	Theory	02
		FTR-203-MRM	Practicals of Food Chemistry	Practical	02
	Vocational Skill Course	FTR-204-VSC	Food Analytical Techniques	Practical	02
	Field Project/On-job Training	FTR-205- FP/OJT	Field Project/ On-job Training	Project	02
	Minor	FTR-206-MN	Plantation crops	Theory	02
	Minor	FTR-207-MN	Plantation crops	Practical	02
	Open Elective(OE)	FTR-208-OE	Preservation Technology	Theory	02
	Generic IKS Course (IKS)	FTR-209-IKS	Ayurveda and Nutrition	Theory	02
	Ability Enhancement Course (AEC)	FTR-210-AEC	Marathi/Hindi/Sanskrit	Theory	02
	Co-curricular Course(CC)	FTR-211-CC	To be selected from the Basket	Theory/ Practical	02
				Total Credits Semester-III	**22**
IV	Major Mandatory	FTR-251-MRM	Processing of Cereals and Pulses	Theory	02
		FTR-252-MRM	Plantation Crop	Theory	02
		FTR-253-MRM	Practicals of Processing of Cereals and Pulses	Practical	02
	Vocational Skill Course	FTR-254-VSC	Confectionery Technology	Practical	02
	Field Project/On-job Training	FTR-255-FP/OJT	Field Project/ On-job Training	Practical	02
	Minor	FTR-256-MN	Beverage Technology	Theory	02
	Minor	FTR-257-MN	Beverage Technology	Practical	02
	Open Elective(OE)	FTR-258-OE	Preservation Technology	Practical	02
	Skill Enhancement Course (SEC)	FTR-259-SEC	Confectionery Technology	Theory	02

Ability Enhancement Course (AEC)	FTR-260-AEC	Marathi/Hindi/Sanskrit	Theory	02
Co-curricular Course(CC)	FTR-261-CC	To be selected from the Basket	Theory/ Practical	02
			Total Credits Semester-IV	**22**

Semester- III

CBCS Syllabus as per NEP 2020 for S.Y B.Voc. Food Processing & Post Harvest Technology (2025 Pattern)

Name of the Programme : B.Voc. Food Processing & Post Harvest Technology

Programme Code : FTR

Class : S.Y B.Voc.

Semester III

Course Type : Major Mandatory (T)

Course Code : FTR-201-MRM

Course Title : Food Chemistry

No. of Credits : 02

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 know Quality 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

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

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

Justification of POs

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 of various food processing techniques.
CO2: The students will know the importance of various preservation techniques.
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

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 the importance of various preservation techniques.
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

PO3- Employability Skills: Students will gain employability skills such as communication, teamwork, leadership, adaptability, and professionalism, which are essential for success in the workplace.
CO2: The students will know the importance of various preservation techniques.
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

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: Students will have a thorough understanding of various food processing techniques.
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

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: Students will have a thorough understanding of various food processing techniques.
CO4: The students will know Quality Control and Waste Utilization in fruits & vegetables

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: Students will have a thorough understanding of various food processing techniques.
CO4: The students will know Quality Control and Waste Utilization in fruits & vegetables

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: Students will have a thorough understanding of various food processing techniques.
CO2: The students will know the importance of various preservation techniques.
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

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: Students will have a thorough understanding of various food processing techniques.
CO3: The students will knowabout nutritional importance of fruits, vegetable and plantation crops

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 of various food processing techniques.
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: Carbohydrates **Teaching Hours**
1.1 General classification, distribution and importance, **7 L**
1.2 physical and chemical properties
1.3 synthesis and breakdown of glucose, starch, cellulose and pectic acid

Unit-2: Lipids&Vitamins **8 L**
2.1 General classification, structure, physical and chemical properties,

2.2 components of fattyacid,
2.3 Technology of edible fats and oils- Refining,
2.4 Hydrogenation and Inter-esterification
2.5 Vitamin: Chemistry, bioavailability and role of vitamins in food- outline**.**

Unit-3: Amino acid and Proteins **7 L**

3.1 Importance, classification, structure of amino acid, peptide and proteins, primary, secondary, tertiary and quaternary structure of proteins,
3.2 source and distribution, physical and chemical properties,
3.3 Functional properties of proteins eg. Organoleptic, solubility, viscosity, binding gelation / texturization, emulsification, foaming.

Unit-4: Food Industry Enzyme **8 L**

4.1 Introduction, nature, classification, nomenclature, role, specificity,
4.2 hypothesis- lock andkey, induced to fit,
4.3 Enzymatic and Non-Enzymatic Browning, Maillard Reaction, Caramelization reaction,
4.4 Enzymes in food industry, Industrial Uses of Enzymes.

References:

1. Fennema, Owen R, Food Chemistry, 3rd Ed., Marcell Dekker, New York, 1996
2. Whitehurst and Law, Enzymes in Food Technology, CRC Press, Canada, 2002
3. Wong, Dominic WS, Food Enzymes, Chapman and Hall, New York, 1995
4. Potter,N.N.and Hotchkiss,J.H, Food Science, 5th Ed., Chapman & Hall,1995
5. DeMan, John M., Principles of Food Chemistry ,3rd Ed., Springer 1999
6. Desrosier, Norman W. and Desrosier.,James N.,The technology of food preservation , 4th Ed.,Westport, Conn. : AVI Pub. Co., 1977.
7. Fuller, Gordon W, New Product Development From Concept to Marketplace, CRC Press,2004.
8. Manay, S. & Shadaksharaswami, M., Foods: Facts and Principles, New Age Publishers, 2004
9. Ranganna S, Handbook of Analysis and Quality Control for Fruits and Vegetable Products, 2nd ed. TMH Education Pvt. Ltd, 1986
10. Essentials of Food Science – Vickie A. Vaclavik, Elizabeth W. Chrishtian

CBCS Syllabus as per NEP 2020 for S.Y B.Voc. Food Processing & Post Harvest Technology (2025 Pattern)

Name of the Programme **:** B.Voc. Food Processing & Post Harvest Technology

Programme Code **:** FTR-202

Class **:** S.Y B.Voc.

Semester III

Course Type **:** Major Mandatory (T)

Course Code **:** FTR-202-MRM

Course Title **:** Food Engineering

No.of Credits :02

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 know Quality 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

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

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: Students will have a thorough understanding of various food processing techniques.
CO2: The students will know the importance of various preservation techniques.

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

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 the importance of various preservation techniques.
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

PO3- Employability Skills: Students will gain employability skills such as communication, teamwork, leadership, adaptability, and professionalism, which are essential for success in the workplace.
CO2: The students will know the importance of various preservation techniques.
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

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: Students will have a thorough understanding of various food processing techniques.
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

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: Students will have a thorough understanding of various food processing techniques.
CO4: The students will know Quality Control and Waste Utilization in fruits & vegetables

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: Students will have a thorough understanding of various food processing techniques.
CO4: The students will know Quality Control and Waste Utilization in fruits & vegetables

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: Students will have a thorough understanding of various food processing techniques.
CO2: The students will know the importance of various preservation techniques.
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

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: Students will have a thorough understanding of various food processing techniques.
CO3: The students will knowabout nutritional importance of fruits, vegetable and plantation crops

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 of various food processing techniques.
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	**Teachings Hours**

Unit 1: Introduction to Food Engineering **8 L**
1.1 Introduction to Food Engineering
1.2 Definition of Velocity, Speed, Acceleration, Force and momentum, Weight, Pressure, Work and Energy
1.3 Concept of Unit Operation 1.4 Units and dimensions

Unit 2: Principles of Heat processing **8 L**
2.1 Mass and Energy Balance,
2.2 Heat and Mass Transfer, Modes of heat transfer
2.3 Modes of heat transfer
2.4 Systems for heating and cooling food products
2.5 Steam Generation and Boiler Design

Unit 3: Fluid mechanism **7 L**
3.1 Properties of Liquids, Properties of Solids
3.2 Properties of Gases
3.3 Fluid dynamics
3.4 Fluid flow and its applications
3.5 Newton's Law of Rheology

Unit-4 Mechanical separation and particle size **7L**

4.1 Separation Techniques and their Principles – filtration, membrane concentration, sieving, centrifugation, Sedimentation
4.2 Size reduction and Classification- Mixing, Kneading, Blending
4.3 Mechanical handling conveying and elevation

References:

Introduction to Food Engineering, R. Paul Singh and Dennis R. Heldman Romeo T. Toledo. 1999.
2. Fundamentals of Food Process Engineering. Third Edition. Aspen publisher. S. S. H. Rizvi and Gauri S. Mittal. 1992.
3. Experimental methods in food engineering. Kluwer Academic Publishers Group. Heldman, D.R. and Lund, D.B. Ed. 1992.
4. Handbook of Food Engineering Marcel Dekker, New York. Batty, J.C. and Folkman, S.L. 1983. Food Engineering Fundamentals. John wiley and Sons, N.York. Harper, J.C. 1975.
5. Elements of Food Engineering. AVI, Westport.

CBCS Syllabus as per NEP 2020 for S.Y B.Voc. Food Processing & Post Harvest Technology (2025 Pattern)

Name of the Programme **:**B.Voc. Food Processing & Post Harvest Technology

Programme Code **:**FTR

Class **:**S.Y B.Voc.

Semester III

CourseType **:**Major Mandatory (P)

Course Code **:**FTR-203-MRM

Course Title **:** Practicals of Food Chemisry

No.of Credits :02

No. of Teaching Hours **:**30

Learning Objectives:

- To study importance and methods of food analysis
- To gain clear understanding of the analytical procedure use to analyse specific food compounds
- To study qualitative and quantitative methods of food analysis
- To study different techniques used in analysis of food
- To study the subjective and objective evaluation of food

- To study the working principle of instruments used for analysis
- To develop the skills on the quantification technique of various components, allergens present in food products.

Course Outcomes:

CO1: Students will have a thorough understanding on the working principle and instrumentation of various instruments used in food analysis
CO2: The students will know the importance of various methods to identify any malfunction aspect of food.
CO3: The students will know qualitative and quantitative methods of food analysis
CO4: The students will know different techniques used in analysis of food
CO5: The students will know the subjective and objective evaluation of food
CO6: The students will know the working principle of instruments used for analysis
CO7: The students will know the quantification technique of various components, allergens present in food products.

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	6	6	5	5	-	-	4	-	-	-
CO2	3	3	-	-	4	-	4	-	-	-
CO3	6	6	5	6	-	-	5	-	3	-
CO4	7	6	4	5	-	-	5	2	3	-
CO5	-	-	3	5	2	-	5	4	1	3
CO6	5	6	4	4	-	-	6	1	-	-
CO7	-	5	-	3	-	-	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: Students will have a thorough understanding on the working principle and instrumentation of various instruments used in food analysis
CO2: The students will know the importance of various methods to identify any malfunction aspect of food.
CO3: The students will know qualitative and quantitative methods of food analysis
CO4: The students will know different techniques used in analysis of food
CO6: The students will know the working principle of instruments used for analysis

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: Students will have a thorough understanding on the working principle and instrumentation of various instruments used in food analysis
CO2: The students will know the importance of various methods to identify any malfunction aspect of food.
CO3: The students will know qualitative and quantitative methods of food analysis
CO4: The students will know different techniques used in analysis of food
CO6: The students will know the working principle of instruments used for analysis
CO7: The students will know the quantification technique of various components, allergens present in food products.

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: Students will have a thorough understanding on the working principle and instrumentation of various instruments used in food analysis
CO3: The students will know qualitative and quantitative methods of food analysis
CO4: The students will know different techniques used in analysis of food
CO5: The students will know the subjective and objective evaluation of food
CO6: The students will know the working principle of instruments used for analysis

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: Students will have a thorough understanding on the working principle and instrumentation of various instruments used in food analysis
CO3: The students will know qualitative and quantitative methods of food analysis
CO4: The students will know different techniques used in analysis of food
CO5: The students will know the subjective and objective evaluation of food
CO6: The students will know the working principle of instruments used for analysis
CO7: The students will know the quantification technique of various components, allergens present in food products.

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.
CO2: The students will know the importance of various methods to identify any malfunction aspect of food.
CO5: The students will know the subjective and objective evaluation of food

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: Students will have a thorough understanding on the working principle and instrumentation

of various instruments used in food analysis
CO2: The students will know the importance of various methods to identify any malfunction aspect of food.
CO3: The students will know qualitative and quantitative methods of food analysis
CO4: The students will know different techniques used in analysis of food
CO5: The students will know the subjective and objective evaluation of food
CO6: The students will know the working principle of instruments used for analysis
CO7: The students will know the quantification technique of various components, allergens present in food products.

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.
CO4: The students will know different techniques used in analysis of food
CO5: The students will know the subjective and objective evaluation of food
CO6: The students will know the working principle of instruments used for analysis

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.

CO3: The students will know qualitative and quantitative methods of food analysis
CO4: The students will know different techniques used in analysis of food
CO5: The students will know the subjective and objective evaluation of food

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
CO5: The students will know the subjective and objective evaluation of food

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

16) Effect of Acid & alkali on colour of fruits & vegetables 1P
17) Estimation of vitamins 1P
18) Estimation of minerals 1P
19) Effect of sugar on boiling point of water 1P
20) Visit to food analysis laboratory 1P
21) Preparation of visit report & presentation 2P

References:

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

CBCS Syllabus as per NEP 2020 for S.Y B.Voc. Food Processing & Post Harvest Technology (2025 Pattern)

Name of the Programme **:**B.Voc. Food Processing & Post Harvest Technology

Programme Code **:**FTR

Class **:**S.Y B.Voc.

Semester III

CourseType **:**Vocational Skill Course(VSC) (P)

Course Code **:**FTR-204-VSC

Course Title **:**Food Analytical techniques

No.of Credits :02

No. of Teaching Hours **:**30

Learning Objectives:

- To study importance and methods of food analysis
- To gain clear understanding of the analytical procedure use to analyse specific food compounds

- To study qualitative and quantitative methods of food analysis
- To study different techniques used in analysis of food
- To study the subjective and objective evaluation of food
- To study the working principle of instruments used for analysis
- To develop the skills on the quantification technique of various components, allergens present in food products.

Course Outcomes:

CO1: Students will have a thorough understanding on the working principle and instrumentation of various instruments used in food analysis
CO2: The students will know the importance of various methods to identify any malfunction aspect of food.
CO3: The students will know qualitative and quantitative methods of food analysis
CO4: The students will know different techniques used in analysis of food
CO5: The students will know the subjective and objective evaluation of food
CO6: The students will know the working principle of instruments used for analysis
CO7: The students will know the quantification technique of various components, allergens present in food products.

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	6	6	5	5	-	-	4	-	-	-
CO2	3	3	-	-	4	-	4	-	-	-
CO3	6	6	5	6	-	-	5	-	3	-
CO4	7	6	4	5	-	-	5	2	3	-
CO5	-	-	3	5	2	-	5	4	1	3
CO6	5	6	4	4	-	-	6	1	-	-
CO7	-	5	-	3	-	-	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: Students will have a thorough understanding on the working principle and instrumentation of various instruments used in food analysis
CO2: The students will know the importance of various methods to identify any malfunction aspect of food.
CO3: The students will know qualitative and quantitative methods of food analysis
CO4: The students will know different techniques used in analysis of food
CO6: The students will know the working principle of instruments used for analysis

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: Students will have a thorough understanding on the working principle and instrumentation of various instruments used in food analysis
CO2: The students will know the importance of various methods to identify any malfunction aspect of food.
CO3: The students will know qualitative and quantitative methods of food analysis
CO4: The students will know different techniques used in analysis of food
CO6: The students will know the working principle of instruments used for analysis
CO7: The students will know the quantification technique of various components, allergens present in food products.

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: Students will have a thorough understanding on the working principle and instrumentation of various instruments used in food analysis
CO3: The students will know qualitative and quantitative methods of food analysis
CO4: The students will know different techniques used in analysis of food
CO5: The students will know the subjective and objective evaluation of food
CO6: The students will know the working principle of instruments used for analysis

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: Students will have a thorough understanding on the working principle and instrumentation of various instruments used in food analysis
CO3: The students will know qualitative and quantitative methods of food analysis
CO4: The students will know different techniques used in analysis of food
CO5: The students will know the subjective and objective evaluation of food
CO6: The students will know the working principle of instruments used for analysis
CO7: The students will know the quantification technique of various components, allergens present in food products.

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.
CO2: The students will know the importance of various methods to identify any malfunction aspect of food.
CO5: The students will know the subjective and objective evaluation of food

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: Students will have a thorough understanding on the working principle and instrumentation of various instruments used in food analysis
CO2: The students will know the importance of various methods to identify any malfunction aspect of food.
CO3: The students will know qualitative and quantitative methods of food analysis
CO4: The students will know different techniques used in analysis of food
CO5: The students will know the subjective and objective evaluation of food
CO6: The students will know the working principle of instruments used for analysis
CO7: The students will know the quantification technique of various components, allergens present in food products.

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.
CO4: The students will know different techniques used in analysis of food
CO5: The students will know the subjective and objective evaluation of food
CO6: The students will know the working principle of instruments used for analysis

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.

CO3: The students will know qualitative and quantitative methods of food analysis
CO4: The students will know different techniques used in analysis of food
CO5: The students will know the subjective and objective evaluation of food

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
CO5: The students will know the subjective and objective evaluation of food

Topics and Learning Points	**Teaching Hours**
1. Principle and working of analytical instrument such as colorimeter, balances, oven, muffle furnace, incubator, centrifuge	3P
2. Estimation of Moisture from food sample	3P
3. Estimation of total minerals from food sample	3P
4. Estimation of Protein from food sample	3P
5. Estimation of Fat from food sample	3P
6. Qualitative test for carbohydrates	2P
7. Phenol sulphuric acid test for carbohydrates	2P
8. Estimation of starch by anthrone reagent	2P

9. Verification of Beer's and lambert's law	2P
10. Estimation of Fiber from food sample	2P
11. Determination of acidity of honey sample	1P
12. Determination of protein by Biuret method	2P
13. Visit to Food Analysis Laboratory	1P
14. Preparation of visit report & presentation	2P

CBCS Syllabus as per NEP 2020 for S.Y B.Voc. Food Processing & Post Harvest Technology (2025 Pattern)

Name of the Programme **:**B.Voc. Food Processing & Post Harvest Technology

Programme Code **:**FTR

Class **:**S.Y B.Voc.

Semester III

Course Type **:**Field Project

Course Code **:**FTR-205-FP/OJT (P)

Course Title **:**Field Project (FP)

No. of Credits :02

No .of Teaching Hours 30

CBCS Syllabus as per NEP 2020 for S.Y B.Voc. Food Processing & Post Harvest Technology (2025 Pattern)

Name of the Programme **:**B.Voc. Food Processing & Post Harvest Technology

Programme Code **:**FTR

Class **:**S.Y B.Voc.

Semester III

CourseType **:**Minor (MN) (T)

Course Code **:** FTR-206-MN

CourseTitle **:** Plantation crops

No.of Credits :02

No. of Teaching Hours **:**30

Learning Objectives:

- To impart knowledge of understanding of various food plantation techniques
- To learn about nutritional importance of fruits, vegetable and plantation crops
- To learn about processing of various spices, tea, coffee and cocoa.
- To study about various nutritional value and health benefits food plantation crops
- To study about various types of plantation crops.
- To study know History & Origin food plantation crops

Course Outcomes:

CO1: Students will have a thorough understanding of various food plantation techniques.
CO2: The students will know the nutritional importance of Plantation Crops
CO3: The students will know about nutritional value and health benefits food plantation crops
CO4: The students will know History & Origin food plantation crops
CO5: The students will know about composition and nutritional value of tea, coffee & Cocoa
CO6: The students will know about composition and nutritional value of spics & condiments
CO7: The students will know various types of various plantation crops.

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	6	5	5	4	2	3	-	2	-	-
CO2	-	-	-	-	2	-	-	-	-	-
CO3	2	-	-	-	4	-	-	-	-	-
CO4	-	-	-	-	4	-	-	2	2	1
CO5	-	-	-	2	1	3	-	-	-	-
CO6	1	-	2	2	1	3	-	-	-	-
CO7	-	-	-	2	4	6	-	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.
CO1: Students will have a thorough understanding of various food plantation techniques.
CO3: The students will know about nutritional value and health benefits food plantation crops
CO6: The students will know about composition and nutritional value of spics & condiments

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: Students will have a thorough understanding of various food plantation techniques.

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: Students will have a thorough understanding of various food plantation techniques.
CO6: The students will know about composition and nutritional value of spics & condiments

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: Students will have a thorough understanding of various food plantation techniques.
CO5: The students will know about composition and nutritional value of tea, coffee & Cocoa
CO6: The students will know about composition and nutritional value of spics & condiments
CO7: The students will know various types of various plantation crops.

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: Students will have a thorough understanding of various food plantation techniques.
CO2: The students will know the nutritional importance of Plantation Crops
CO3: The students will know about nutritional value and health benefits food plantation crops
CO4: The students will know History & Origin food plantation crops
CO5: The students will know about composition and nutritional value of tea, coffee & Cocoa
CO6: The students will know about composition and nutritional value of spics & condiments
CO7: The students will know various types of various plantation crops.

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: Students will have a thorough understanding of various food plantation techniques.
CO5: The students will know about composition and nutritional value of tea, coffee & Cocoa
CO6: The students will know about composition and nutritional value of spics & condiments
CO7: The students will know various types of various plantation crops.

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: Students will have a thorough understanding of various food plantation techniques.
CO4: The students will know History & Origin food plantation crops
CO7: The students will know various types of various plantation crops.

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: The students will know History & Origin food plantation crops
CO7: The students will know various types of various plantation crops.

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
CO4: The students will know History & Origin food plantation crops

Topics and Learning Points	**Teaching Hours**

Unit 1: Introduction to plantation Crops **8 P**

1.1 Introduction, History & Origin– (Tea,Coffee, Cocoa, Spices),
1.2 Defination, Scope & Importance of Plantation Crops
1.3 Important crops of India, Role of plantation Crops,
1.4 Inter crops and mixed crops.

Unit 2: Tea & Coffee **8 P**

2.1 Introduction, Classification, Composition, manufacturing process of Tea
2.2 Advantage & Disadvantages of Tea.
2.3 Introduction, Classification, Composition, manufacturing process of Coffee,
2.4 Advantage & Disadvantages of Coffee

Unit 3: Cocoa Processing **7 P**

3.1 History, Introduction,
3.2 Classification, Composition, manufacturing process of Cocoa, Cocoa Liquor, Cocoa Butter Cocoa Powder
3.3 Advantage & Disadvantages of Cocoa

Unit-4 Spices and Condiments **7P**

4.1 History, Introduction, Defination,
4.2 Importance, Uses of spices and Condiments
4.3 Classification,Composition.
Major Spices:
Minor Spices:

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

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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
9. Banerjee B. 2002. Tea Production and Processing. Oxford Univ. Press.
10. Minifie BW. 1999. Chocolate, Cocoa and Confectionery Technology. 3rd Ed. Aspen Publ.
11. NIIR. 2004. Handbook on Spices. National Institute of Industrial Research Board, Asia Pacific Business Press Inc

CBCS Syllabus as per NEP 2020 for S.Y B.Voc. Food Processing & Post Harvest Technology (2025 Pattern)

Name of the Programme **:**B.Voc. Food Processing & Post Harvest Technology

Programme Code **:**FTR

Class **:**S.Y B.Voc.

Semester III

Course Type **:** Minor

Course Code **:** FTR-207-MN (P)

Course Title **:** Plantation crops

No.of Credits : 02

No. of Teaching Hours **:** 30

No. of Teaching Hours **:**30

Learning Objectives:

- To impart knowledge of understanding of various food plantation techniques
- To learn about nutritional importance of fruits, vegetable and plantation crops
- To learn about processing of various spices, tea, coffee and cocoa.
- To study about various nutritional value and health benefits food plantation crops

- To study about various types of plantation crops.
- To study know History & Origin food plantation crops

Course Outcomes:

CO1: Students will have a thorough understanding of various food plantation techniques.
CO2: The students will know the nutritional importance of Plantation Crops
CO3: The students will know about nutritional value and health benefits food plantation crops
CO4: The students will know History & Origin food plantation crops
CO5: The students will know about composition and nutritional value of tea, coffee & Cocoa
CO6: The students will know about composition and nutritional value of spics & condiments
CO7: The students will know various types of various plantation crops.

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

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: Students will have a thorough understanding of various food plantation techniques.
CO3: The students will know about nutritional value and health benefits food plantation crops
CO4: The students will know different types of Masala & their preparation methods
CO6: The students will know the Maturity indices in spices and condiments

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: Students will have a thorough understanding of various food plantation techniques.
CO4: The students will know different types of Masala & their preparation methods
CO6: The students will know the Maturity indices in spices and condiments
CO7: The students will know different types of spices.

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: Students will have a thorough understanding of various food plantation techniques.

CO4: The students will know different types of Masala & their preparation methods
CO6: The students will know the Maturity indices in spices and condiments

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: Students will have a thorough understanding of various food plantation techniques.
CO4: The students will know different types of Masala & their preparation methods
CO5: The students will know about composition and nutritional value of tea, coffee & Cocoa

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.
CO2: The students will know the nutritional importance of Plantation Crops
CO3: The students will know about nutritional value and health benefits food plantation crops
CO5: The students will know about composition and nutritional value of tea, coffee & Cocoa
CO6: The students will know the Maturity indices in spices and condiments

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: The students will know about composition and nutritional value of tea, coffee & Cocoa
CO6: The students will know the Maturity indices in spices and condiments
CO7: The students will know different types of spices.

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: Students will have a thorough understanding of various food plantation techniques.
CO4: The students will know different types of Masala & their preparation methods
CO6: The students will know the Maturity indices in spices and condiments
CO7: The students will know different types of spices.

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: The students will know different types of Masala & their preparation methods
CO7: The students will know different types of spices.

Topics and Learning Points

1)	Introduction & Identification of spices	2P
2)	To study Grading in Spices and Condiments	2P
3)	To study the Maturity Standards in spices and condiments	1P
4)	Extraction of Essential Oils	1P
5)	Preparation of Tea	1P
6)	Preparation of Coffee	1P
7)	Preparation of Turmeric powder	2P
8)	Determination of Curcumin	2P
9)	Preparation of Goda Masala	1P
10)	Preparation of Coriander powder	2P
11)	Preparation of Chilli powder & Chilli flakes	2P
12)	Preparation of Chaat Masala	2P
13)	Preparation of Garam Masala	2P
14)	Spices Album	1P
15)	Visit to spice processing Industry	8P

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
9. Banerjee B. 2002. Tea Production and Processing. Oxford Univ. Press.
10. Minifie BW. 1999. Chocolate, Cocoa and Confectionery Technology. 3rd Ed. Aspen Publ.
11. NIIR. 2004. Handbook on Spices. National Institute of Industrial Research Board, Asia Pacific Business Press Inc.

CBCS Syllabus as per NEP 2020 for S.Y B.Voc. Food Processing & Post Harvest Technology (2025 Pattern)

Name of the Programme :B.Voc. Food Processing & Post Harvest Technology

Programme Code :FTR

Class :S.Y B.Voc.

Semester III

Course Type :Open Elective(OE) (T)

Course Code :FTR-208-OE

Course Title :Preservation Technology

No.of Credits :02

No. of Teaching Hours 30

Learning Objectives:

- To study importance of shelf life and preservation of foods
- To study traditional methods of food preservation
- To study different modern methods of food preservation
- To develop the skills for processing of food after postharvest
- To learn various types of food preservatives
- To study current scenario of food preservation
- To study traditional methods of food preservation

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 traditional methods of food preservation
CO3: Students will have thorough knowledge of emerging preservation techniques
CO4: Students will get practical skills for processing of food after postharvest
CO5: Students will have a thorough understanding of types of food preservatives
CO6: Students will get thorough knowledge of current scenario of food preservation
CO7: Students will know importance of various packaging and processing methods in food preservation

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	6	6	5	4	2	-	6	4	2	1

CO2	**-**	**5**	**6**	**4**	**2**	**-**	**-**	**-**	**-**	**-**
CO3	**2**	**4**	**5**	**3**	**5**	**-**	**-**	**-**	**-**	**-**
CO4	**5**	**4**	**6**	**3**	**2**	**2**	**-**	**3**	**-**	**-**
CO5	**-**	**5**	**6**	**4**	**2**	**-**	**-**	**-**	**-**	**-**
CO6	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**7**	**2**	**-**
CO7	**4**	**-**	**3**	**4**	**-**	**6**	**-**	**4**	**-**	**-**

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: Students will have a thorough understanding of various food processing techniques.
CO3: The students will know about traditional methods of food preservation
CO3: Students will have thorough knowledge of emerging preservation techniques
CO4: Students will get practical skills for processing of food after postharvest
CO7: Students will know importance of various packaging and processing methods in food preservation

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: 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 traditional methods of food preservation
CO3: Students will have thorough knowledge of emerging preservation techniques
CO4: Students will get practical skills for processing of food after postharvest
CO5: Students will have a thorough understanding of types of food preservatives

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: 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 traditional methods of food preservation
CO3: Students will have thorough knowledge of emerging preservation techniques
CO4: Students will get practical skills for processing of food after postharvest
CO5: Students will have a thorough understanding of types of food preservatives
CO7: Students will know importance of various packaging and processing methods in food preservation

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: Students will have a thorough understanding of various food processing techniques.
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CO4: Students will get practical skills for processing of food after postharvest
CO5: Students will have a thorough understanding of types of food preservatives
CO7: Students will know importance of various packaging and processing methods in food preservation

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: 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 traditional methods of food preservation
CO3: Students will have thorough knowledge of emerging preservation techniques
CO4: Students will get practical skills for processing of food after postharvest
CO5: Students will have a thorough understanding of types of food preservatives

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.
CO4: Students will get practical skills for processing of food after postharvest
CO7: Students will know importance of various packaging and processing methods in food preservation

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: Students will have a thorough understanding of various food processing techniques.

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: Students will have a thorough understanding of various food processing techniques.
CO4: Students will get practical skills for processing of food after postharvest
CO6: Students will get thorough knowledge of current scenario of food preservation
CO7: Students will know importance of various packaging and processing methods in food preservation

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 of various food processing techniques.
CO6: Students will get thorough knowledge of current scenario of food preservation

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 of various food processing techniques.

Topics and Learning Points	**Teaching Hours**

Unit-1: Introduction to Preservation **08 Periods**
1.1 Introduction & History of food preservation,
1.2 Definition, principles & Need,
1.3 Traditional methods of Food Preservation,
1.4 Types of preservatives- Class I & Class II,
1.5 Bio preservation,
1.6 Enzymes as a food preservatives

Unit-II: Preservation by high temperature **07 Periods**
2.1 Principle of high temperature preservation,
2.2 methods of high temperature preservation: Blanching, Drying
2.3 Pasteurization, Sterilization
2.4 Canning.

Unit-III: Preservation by Low temperature **07 Periods**
3.1 Principle of high temperature preservation,
3.2 methods of low temperature preservation: Chilling, Refrigeration
3.3 freezing and irradiation
3.4 Effect of low temperature preservation methods on food & microorganisms

Unit-IV: Modern methods of food preservation **08 Periods**
4.1 Non-thermal methods of food preservation: Pulse electric heating
4.2 high pressure processing, ohmic heating, etc.
4.3 hurdle technology and nanotechnology

References:

- Food Facts & Principles – N. Shakuntala Manay, M. Shadaksharswamy
- Food Science – Sumati R. Mudambi, Shalini M. Rao, M.V.Rajagopal
- Essentials of Food Science – Vickie A. Vaclavik, Elizabeth W. Chrishtian
- Food Science (Vth edition) – Norman N. Potter and Joseph H. Hotchkiss (CSB Publishers and Distributors, New Delhi, 1996)
- Food Preservation, Desorier

- Unit Operations by Brennan & Cowell Lilly

CBCS Syllabus as per NEP 2020 for S.Y B.Voc. Food Processing & Post Harvest Technology (2025 Pattern)

Name of the Programme **:**B.Voc. Food Processing & Post Harvest Technology

Programme Code **:**FTR

Class **:**S.Y B.Voc.

Semester III

Course Type **:**Generic IKS Course (IKS) (T)

Course Code **:**FTR-209-IKS

Course Title **:** Ayurveda and Nutrition

No.of Credits :02

No. of Teaching Hours 30

Learning Objectives:

- To study importance of shelf life and preservation of foods
- To study traditional methods of food preservation
- To study different modern methods of food preservation
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- To learn various types of food preservatives
- To study current scenario of food preservation
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CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	6	6	5	4	2	-	6	4	2	1
CO2	-	5	6	4	2	-	-	-	-	-
CO3	2	4	5	3	5	-	-	-	-	-
CO4	5	4	6	3	2	2	-	3	-	-
CO5	-	5	6	4	2	-	-	-	-	-
CO6	-	-	-	-	-	-	-	7	2	-
CO7	4	-	3	4	-	6	-	4	-	-

Justification for mapping

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preservation

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Topics and Learning Points	Teaching Hours

Unit- I Introduction to Ayurvedic Nutrition **8L**
Ayurveda and Indian food cultures
Nutrition and lifestyle transition over the years
Regional Food Traditions of India

Unit- II Basic principles of Food and Nutrition and Ayurveda **7L**
Introduction, Basic principles of Food and Nutrition
Understanding rich sources of nutrients
Concept of Doshas & assessment

Unit- Ill Ayurvedic Diets **8L**
Principles of Diet: Aharavidhi vidhan, Sattvic, Rajasi, Tamasic foods
Incompatible food (Viruddha Ahara), Pathya; Apathya; Viprita Ahaar
Lifestyle Management with Dincharya and Ritucharya

Unit- IV Principles of Ayurvedic food habits **8L**
Ayurvedic Principles of food habits and factors determining quality of food (Ahara vidhi visheshaayatana)
FSSAI regulations on Ayurvedic Aahar
Application of Ayurvedic diets to stress linked food behavior

References:

Rastogi S {2014) Ayurvedic Science of Food and Nutrition. ASIN: BOOHWMV094, Springer: ISBN-13:978-1461496274
Rastogi S (2010) Building bridges between Ayurveda and modern science. Int J Ayurveda Res. 1(1):41-46.
FSSAI regulations on Ayurveda Aahar Regulations 2022. Gazette of India CG-DL-E-07052022-235642. New Delhi, Friday, May 6, 2022/ Vaisakha 16, 1944.
Frawley D (2012) Ayurvedic healing: A comprehensive guide. Lotus Press, India.
https://iksindia.org/: Indian Knowledge Systems

CBCS Syllabus as per NEP 2020 for S.Y B.Voc. Food Processing & Post Harvest Technology (2025 Pattern)

Name of the Programme	**:**B.Voc. Food Processing & Post Harvest Technology
Programme Code	**:**FTR
Class	**:**S.Y B.Voc.
Semester	III
Course Type	**:**Ability Enhancement Course(AEC) (T)
Course Code	**:**FTR-210-AEC
Course Title	**:**Marathi/Hindi/ Sanskrit
No.of Credits	:02
No. of Teaching Hours	30

CBCS Syllabus as per NEP 2020 for S.Y B.Voc. Food Processing & Post Harvest Technology (2025 Pattern)

Name of the Programme	**:**B.Voc. Food Processing & Post Harvest Technology
Programme Code	**:**FTR
Class	**:**S.Y B.Voc.
Semester	III
Course Type	**:** Co-curricular Course (CC) (T/P)
Course Code	**:**FTR-211-CC
Course Title	**:** To be selected from the basket
No. of Credits	:02
No. of Teaching Hours	30