Anekant Education Society's

Tuljaram Chaturchand College of Arts, Science & Commerce, Baramati

(Autonomous)

Three/Four Year Honours/Honours with Research B.Voc. Degree

Program in Food Processing and Post Harvest Technology

(Faculty of Science)

CBCS Syllabus

FY B.Voc. (Food Processing and Post Harvest Technology)

For Department of Food Technology and Research

Choice Based Credit System Syllabus

(2025 Pattern)

(As Per NEP-2020)

To be implemented from Academic Year 2025-2026

Title of the Programme: FY B.Voc. (Food Processing and 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. As per the recommendation of stearing committee meeting held on 22nd and 23rd April 2025 they have suggested separate guideline for vocational programme. This syllabus is according to the same guideline. 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 Food Technology 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, 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 tool, techniques, process which is required to set up agencies including pickles, jam, and jelly, fruit processing, vegetable processing, organic product, dairy products, 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)

PSO-1	**Disciplinary Knowledge**	Understand the basic concepts, fundamental principles and experimental findings and the scientific theories related to food technology, food science and Food technology & engineering and its other fields related to the program.
PSO-2	**Communication Skills**	Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.
PSO-3	**Critical Thinking**	Propose novel idea sin explaining the scientific data, facts and figures related to Science and technology.
PSO-4	**Analytical Reasoning and Problem Solving**	To enable the students with good scientific and engineering knowledge so as to comprehend,design,and create food products and devices for the food industry and provide solutions for the challenges in the food industry as well as in agriculture.
PSO-5	**Senseof Inquiry**	Curiously ask relevant questions for better understanding of fundamental concepts and principles,scientific theories and applications related tothestudy.
PSO-6	**UseofModern Tools**	Operatemoderntools,equipment,instrumentsandlaboratorytechniquesto perform the experiments and write the programs in different languages.
PSO-7	**Research Skills**	Understand how to design, collect, analyze, interpret and evaluate information/data that is relevant to food technology.
PSO-8	**Applicationof Knowledge**	Developascientificoutlookandapplytheknowledgewithrespecttofood technology.
PSO-9	**Ethical Awareness**	Totrainstudentsinprofessionalandethicalattitude,effectivecommunication skills, teamworkskillsandmultidisciplinaryapproachesrelatedtofoodtechnology and engineering.
PSO-10	**Teamwork**	Understandthebasicconcepts,fundamentalprinciplesandexperimental findings and the scientific theories related to food technology, food science and food technology & engineering and its other fields related to the program.
PSO-11	**Environmentand Sustainability**	Developvariouscommunicationskillssuchasreading,listeningandspeaking skills to express ideas and views clearly and effectively.
PSO-12	**LifelongLearning**	Propose novel ideas in explaining the scientific data, facts and figures related to science and technology.

Tuljaram Chaturchand College
of Arts, Science and Commerce Baramati, Dist-Pune
(Empowered Autonomous)
Board of Studies in Food Technology and Research
(Academic Year 2025-26 to 2027-28)

Sr.No.	Name of Member	Designation
1.	**Dr. Khan Wazid A.** Head &Assistant Professor Department of Food Technology and Research, T. C. College, Baramati.	**Chairperson**
2.	**Ms. Katekar Asawari D.** Assistant Professor, Department of Food Technology and Research, T. C. College, Baramati	Member
3.	**Ms.Pawar Tilotama R.** Assistant Professor, Department of Food Technology and Research, T. C. College, Baramati	Member
4.	**Ms. Shinde Soudamini S.** Assistant Professor, Department of Food Technology and Research, T. C. College, Baramati	Member
5.	**Ms. Darandale Tejaswini B.** Assistant Professor, Department of Food Technology and Research, T. C. College, Baramati	Member
6.	**Ms. Aarti Dongare** Assistant Professor, M.Sc. Food Science & Technology	Vice-Chancellor Nominee Subject Expert from SPPU, Pune
7.	**Mr. Gatade Abhijeet** Assistant Professor, Shivaji University, Kolhapur	Subject Expert from Outside the Parent University
8.	**Mr. Pathan Fayaz L.** Associate Professor, MIT-ADT University	Subject Expert from Outside the Parent University
9.	**Mr. Gawate Dadasaheb** Director, Di-Roma Ice-cream, Ahmad Nagar	Representative from industry/corporate sector/allied areas
10.	**Mr. Vairagal Dnyaneshwar** Schreiber Dynamix Pvt. Ltd. Baramati	Member of the College Alumni
11.	**Ms. Vhora Payal**	UG Student
12.	**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.

4.. 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.

Level / Difficulty	Sem	Subject-1	Subject-2	Subject-3	GE/OE	SEC	IKS	AEC	VEC	CC	Total
4.5 / 100	I	2 (T) + 2 (P)	2(T)+2(P)	2(T)+2 (P)	2 (T)	2 (T/P)	2 (T) (Generic)	2 (T)	2	--	22
	II	2 (T) + 2 (P)	2(T)+2(P)	2(T)+2 (P)	2 (P)	2 (T/P)	--	2 (T)	2	2	22
Exit option: Award of UG Certificate in Major with 44 credits and an additional 4 credits core NSQF course/ Internship OR Continue with Major and Minor **Continue option**: Student will select one subject among the (subject 1, subject 2 and subject 3) as major and another as minor and third subject will be dropped.											
Level / Difficulty	**Sem**	**Credits Related to Major**				**Minor**		**GE/OE**	**SEC**	**IKS**	**AEC**	**VEC**	**CC**	**Total**
		Major Core	**Major Electiv**	**VSC**	**FP / OJT/ CEP**									
5.0 / 200	III	4 (T) + 2 (P)	--	2 (P)	2 (OJT)	2(T)+2(P)	--	2 (T)	--	2 (T) (Major Subject Specific)	2 (T)	--	2	22
	IV	4 (T) + 2 (P)	--	2 (P)	2 (OJT)	2(T)+2(P)	--	2 (P)	2 (T/P)	--	2 (T)	--	2	22
Exit option: Award of UG Diploma in Major and Minor with 88 credits and an additional 4 credits core NSQF course/ Internship OR Continue with Major and Minor														
5.5 /300	V	8(T) + 4(P)	2 (T) + 2 (P)	2 (P)	2 (OJT)	2(T)	--	--	--	--	--	--	--	22
	VI	8(T) + 4(P)	2 (T) + 2 (P)	2 (P)	4 (OJT)	--	--	--	--	--	--	--	--	22
Total 3 Years		**44**	**8**	**8**	**10**	**18**	**8**	**8**	**6**	**4**	**8**	**4**	**6**	**132**
Exit option: Award of UG Degree in Major with 132 credits OR Continue with Major and Minor														
6.0 /400	VII	6 (T) + 4 (P)	2 (T) + 2 (T/P)	--	4 (OJT)	4(RM)(T)		--	--	--	--	--	--	22
	VIII	6 (T) + 4 (P)	2 (T) + 2 (T/P)	--	8 (OJT)	0			0	0	0	0	0	22
Total 4 Years		**64**	**16**	**8**	**22**	**22**	**8**	**8**	**6**	**4**	**8**	**4**	**6**	**176**
Four Year UG Honours with Research Degree in Major and Minor with 176 credits **OR**														
6.0 /400	VII	10(T) + 4(P)	2 (T) + 2 (T/P)	0	0	4 (RM) (T)			0	0	0	0	0	22
	VIII	10(T) + 4(P)	2 (T) + 2 (T/P)	0	4 (OJT)	0			0	0	0	0	0	22
Total 4 Years		**72**	**16**	**8**	**14**	**22**	**8**	**8**	**6**	**4**	**8**	**4**	**6**	**176**
Four Year UG Honours Degree in Major and Minor with 176 credits														

- 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 F. Y. B. Voc. (Food Technology) 2025-2026

Sem	Course Type	Course Code	Course Name	Theory /Practical	Credits
I	DSC-I (General)	FTR-101-MJM	Food Processing Technology	Theory	02
		FTR-102-MJM	Practical of Food Processing Technology	Practical	02
	DSC-II (General)	FTR-103-MJM	Food Safety Quality Management	Theory	02
		FTR-104-MJM	Practical Food Safety and Quality Management	Practical	02
	\ DSC-III (General)	FTR-105-MJM	Food Science-I	Theory	02
		FTR-106-MJM	Practical of Food Science-I	Practical	02
	Open Elective(OE)	FTR-107-OE	Basics of Food Science	Theory	02
	Skill Enhancement Course(SEC)	FTR-108-SEC	Culinary Arts	Practical	02
	Indian Knowledge System	FTR-109-IKS	Generic	Theory	02
	Ability Enhancement Course(AEC)	ENG-110-AEC	Functional English-I	Theory	02
	Value Education Course(VEC)	COS-111-VEC	Environmental Education	Theory	02
	Total Credits Semester-I-22				
II	DSC-I (General)	FTR-151-MJM	Preservation of Fruits and Vegetables	Theory	02
		FTR-152-MJM	Practical of Preservation of Fruits and Vegetables	Practical	02
	DSC-II (General)	FTR-153-MJM	Food Adulteration	Theory	02
		FTR-154-MJM	Practical of Food Adulteration	Practical	02
	DSC-III (General)	FTR-155-MJM	Food Science-II	Theory	02
		FTR-156-MJM	Practical of Food Science-II	Practical	02
	Open Elective(OE)	FTR-157-OE	Dairy Product Technology	Practical	02
	Skill Enhancement Course(SEC)	FTR-158-SEC	Traditional Indian Foods	Practical	02
	Ability Enhancement Course(AEC)	ENG-159-AEC	Functional English-II	Theory	02
	Value Education Course(VEC)	FTR-160-VEC	Digital & Technological Solutions	Practical	02
	Co-curicular Course (CC)	YOG/PES/CUL/NSS/NCC-161-CC	To be select from basket	Theory	02
	Total Credits Semester-II- 22				
	Cumulative Credits Semester- I and II				**44**

CBCS Syllabus as per NEP 2020 for F.Y B.Voc. Food Technology & Research (2025 Pattern)

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

Programme Code **:** FTR-101-MJM

Class **:** F.Y B.Voc.

Semester *I*

Course Type **:** Major

Course Code **:** DSC-I (General)

Course Title **:** Food Processing Technology

No. of Credits *:02*

No. of Teaching Hours 30

Learning Objectives:

1. To learn about the food groups
2. To study about the cooking methods
3. To know about working of various equipment used in food processing industries.
4. To get a knowledge about food preservation techniques.
5. To study about the history food processing technology.
6. To learn about the Scope & opportunities in food industries.
7. To study the refrigeration system

Course Outcomes:

CO1: Student will learn about the food groups.
CO2: Student will study about the different cooking methods
CO3: The students may know about working of various equipment used in food processing industries.
CO4: Students will study about the history food processing technology.
CO5: The students will learn about the Scope & opportunities in food industries.
CO6: Students will get knowledge about food preservation techniques.
CO7: The students will know about the advantages & disadvantages of cooking.

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

Justification for the mapping

PO1: Disciplinary knowledge- Understand the basic concepts, fundamental principles and experimental findings and the scientific theories related to food technology, food science and Food technology & engineering and its other fields related to the program.
CO1: Student will learn about the food groups.
CO2: Student will study about the different cooking methods
CO4: Students will study about the history food processing technology.
CO5: The students will learn about the Scope & opportunities in food industries.
CO6: Students will get knowledge about food preservation techniques.

PSO2: Communication Skills - Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.
CO2: Student will study about the different cooking methods
CO3: The students may know about working of various equipment used in food processing industries.

PSO3: Critical Thinking- Propose novel idea sin explaining the scientific data, facts and figures related to science and technology.
CO4: Students will study about the history food processing technology.
CO7: The students will know about the advantages & disadvantages of cooking.

PSO4: Analytical reasoning and problem solving To unable the students with good scientific and engineering knowledge so as to comprehend, design and create food products and devices for food industry and provide solutions for the challenges in the food industry as well as in the agriculture.
CO3: The students may know about working of various equipment used in food processing industries.

PSO5: Sense of Inquiry Curiously ask relevant questions for better understanding of fundamental concepts and principles, scientific theories and applications related to the study.
CO3: The students may know about working of various equipment used in food processing industries.

CO5: The students will learn about the Scope & opportunities in food industries.
CO6: Students will get knowledge about food preservation techniques.

PSO6: Use of modern tools To operate modern tools, equipment, instrument and laboratory techniques to perform the experiments and write the programmes in the different languages.
CO2: Student will study about the different cooking methods
CO6: Students will get knowledge about food preservation techniques.

PSO7: Research skills Understand how to design, collect, analyze, interpret and evaluate information/data that is relevant to food technology.
CO4: Students will study about the history food processing technology.

PSO8: Application of knowledge Develop a scientific outlook and apply the knowledge with respect to food technology.
CO3: The students may know about working of various equipment used in food processing industries.
CO5: The students will learn about the Scope & opportunities in food industries.

PSO9: Ethical awareness to train students in professional and ethical attitude, effective communication skills, team work skills, and multidisciplinary approaches related to food technology and engineering.
CO1: Student will learn about the food groups.
CO5: The students will learn about the Scope & opportunities in food industries.
CO6: Students will get knowledge about food preservation techniques.
CO7: The students will know about the advantages & disadvantages of cooking.

PSO10: Team Work understand the basic concepts, fundamental principles and experimental findings and the scientific theories related to food technology, food science and food technology and engineering and its other fields related to the programme.
CO1: Student will learn about the food groups.
CO2: Student will study about the different cooking methods
CO4: Students will study about the history food processing technology.
CO5: The students will learn about the Scope & opportunities in food industries.
CO6: Students will get knowledge about food preservation techniques.

PSO11: Environmental sustainability Develop various communication skills such and reading, listening and speaking skills to express ideas and views clearly and effectively.
CO2: Student will study about the different cooking methods
CO5: The students will learn about the Scope & opportunities in food industries.
PSO12: Lifelong learning Propose novel ideas in explain the scientific data, fact and figures related to science and technology.
CO4: Students will study about the history food processing technology.

Topics and Learning Points

Unit-1: Basic Food Processing Technology: **07 Periods**

1.1 History, Scope & opportunities in food industries
1.2 Definition, Functions of food
1.3 Food groups- functions of food & nutrients

07 Periods

Unit-2: Utensils &Equipments:

2.1 Measuring cups, measuring spoon, knife, pots, chopping boards, plates, bowls, etc.
2.2 Equipments- Hot air oven, dehydration & canning equipments

Unit-3: Heat Transfer & Cooking: **08 Periods**

3.1 Definitions
3.2 modes of heat transfer
3.3 methods of cooking- advantages & disadvantages

08 Periods

Unit-4: Food Preservation Techniques:

4.1 Preservation by low temperature-
4.1.1 Chilling
4.1.2 Cooling
4.1.3 Refrigeration
4.1.4 Freezing
4.2 Preservation by High Temperature-
4.2.1 Pasteurization
4.2.2 Sterilization
4.2.3 Irradiation
4.2.4 Canning
4.2.5 Drying & Dehydration

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 F.Y B.Voc. Food Technology & Research (2023 Pattern)

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

Programme Code : FTR-102-MJM

Class : F.Y B.Voc.

Semester *I*

Course Type : **DSC-I General)**

Course Code : **FTR-102-MJM**

Course Title : **Practicals of Food Processing Technology**

No.of Credits *:02*

No.of Teaching Hours 30

Learning Objectives:

1. To learn about the food groups
2. To study about the cooking methods
3. To know about working of various utensils used in food processing industries.
4. To get a knowledge about food preservation techniques.
5. To study about the weight and measures
6. To learn about the mode of heat transfer.
7. To get knoledge about refrigration system.

Course Outcomes:

CO1: Student will learn about the food groups.
CO2: Student will study about the different cooking methods
CO3: the students may know about working of various utensils used in food processing industries.
CO4: Students will get knowledge about food preservation techniques
CO5: The students will learn about the weight and measures used in food processing
CO6: Students will get knowledge about mode of heat transfer.
CO7: The students will know about the refrigration system.

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

CO5	-	-	-	3	-	3	2	-	-	-	-	-
CO6	2	-	-	2	-	3	2	-	1	-	-	-
CO7	-	-	-	3	2	3	-	1	-	2	-	1

PSO1: Disciplinary knowledge Understand the basic concepts, fundamental principles and experimental findings and the scientific theories related to food technology, food science and Food technology & engineering and its other fields related to the program.
CO1: Student will learn about the food groups.
CO2: Student will study about the different cooking methods
CO4: Students will get knowledge about food preservation techniques
CO6: Students will get knowledge about mode of heat transfer.

PSO2: Communication Skills - Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.
CO2: Student will study about the different cooking methods
CO3: the students may know about working of various utensils used in food processing industries.

PSO3: Critical Thinking- Propose novel idea sin explaining the scientific data, facts and figures related to science and technology**.**
CO4: Students will get knowledge about food preservation techniques

PSO4: Analytical reasoning and problem solving To unable the students with good scientific and engineering knowledge so as to comprehend, design and create food products and devices for food industry and provide solutions for the challenges in the food industry as well as in the agriculture.
CO3: the students may know about working of various utensils used in food processing industries.
CO5: The students will learn about the weight and measures used in food processing
CO6: Students will get knowledge about mode of heat transfer.
CO7: The students will know about the refrigration system.

PSO5: Sense of Inquiry Curiously ask relevant questions for better understanding of fundamental concepts and principles, scientific theories and applications related to the study.
CO3: the students may know about working of various utensils used in food processing industries.
CO7: The students will know about the refrigration system.

PSO6: Use of modern tools operate modern tools, equipment, instrument and laboratory techniques to perform the experiments and write the programmes in the different languages.
CO2: Student will study about the different cooking methods
CO5: The students will learn about the weight and measures used in food processing
CO6: Students will get knowledge about mode of heat transfer.
CO7: The students will know about the refrigration system.

PSO7: Research skills Understand how to design, collect, analyze, interpret and evaluate information/data that is relevant to food technology.
CO4: Students will get knowledge about food preservation techniques
CO5: The students will learn about the weight and measures used in food processing
CO6: Students will get knowledge about mode of heat transfer.

PSO8: Application of knowledge Develop a scientific outlook and apply the knowledge with respect to food technology.
CO3: the students may know about working of various utensils used in food processing industries.
CO7: The students will know about the refrigration system.

PSO9: Ethical awareness To train students in professional and ethical attitude, effective communication skills, team work skills, and multidisciplinary approaches related to food technology and engineering.
CO1: Student will learn about the food groups.
CO6: Students will get knowledge about mode of heat transfer.

PSO10: Team Work understand the basic concepts, fundamental principles and experimental findings and the scientific theories related to food technology, food science and food technology and engineering and its other fields related to the programme.
CO1: Student will learn about the food groups.
CO4: Students will get knowledge about food preservation techniques
CO7: The students will know about the refrigration system.

PSO11: Environmental sustainability. Develop various communication skills such and reading, listening and speaking skills to express ideas and views clearly and effectively.
CO2: Student will study about the different cooking methods

PSO12: Lifelong learning Propose novel ideas in explain the scientific data, fact and figures related to science and technology.
CO4: Students will get knowledge about food preservation techniques
CO7: The students will know about the refrigration system.

Topics and Learning Points

Sr. No.	Practicals Name	Periods
1.	To study the utensils used in food preservation.	2P
2.	To study the nutritive functions of food products.	2P
3.	To study the weight and measures.	2 P
4.	To study the mode of heat transfer	2 P
5.	To study the different cooking methods.	2P
6.	Study of blanching of different fruits & vegetables .	2P
7.	Study of freezing of different fruits & vegetables	2P
8.	Study the refrigeration system	2 P
9.	To study the irradiation method	2P
10.	To study the drying of food sample	2P
11.	To study the osmotic dehydration	2P
12.	Study the canning of fruit and vegetables	2P
13.	To study the pasteurization of milk	2P
14.	To study the sterilization of milk	2P
15.	Visit to food processing industry	2P

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

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

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

Programme Code : FTR

Class : F.Y B.Voc.

Semester *I*

Course Type : DSC-II (General)

Course Code : FTR-103-MJM

Course Title : Food Safety Quality Management

No.of Credits *:02*

No. of Teaching Hours 30

Learning Objectives:

1. To learn about the importance of food safety
2. To study the different types of hazards
3. To study the morphology of different microorganisms.
4. To study about the factors affecting the growth of micro-organisms.
5. To learn about important microorganisms used in food processing industry.
6. To learn about accreditation and auditing.
7. To get knowledge about the growth curve.

Course Outcomes:

CO1: Students will get knowledge about the importance of food safety and morphology of micro-organisms.
CO2: Students will have a thorough understanding of various factors responsible for food spoilage.
CO3: The students will know the important microorganisms used in food processing industry.
CO4: Student will learn about the different types of hazards
CO5: Students will get knowledge about accreditation and auditing
CO6 Students will learn about important microorganisms used in food processing industry.
CO7: Students will learn about growth curve.

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	6	-	-	-	-	-	-	-	2	2	-	-
CO2	-	-	2	6	5	6	6	-	-	-	-	6
CO3	-	-	-	-	-	-	-	-	-	-	-	2

CO4	**-**	**2**	**-**	**-**	**2**	**-**	**-**	**4**	**-**	**-**	**6**	**-**
CO5	**-**	**-**	**2**	**-**	**2**	**2**	**-**	**2**	**-**	**2**	**-**	**-**
CO6	**4**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**-**	**2**	**-**	**-**
CO7	**2**	**-**	**1**	**4**	**2**	**6**	**-**	**-**	**-**	**-**	**-**	**-**

Justification for the mapping

PSO1: Disciplinary knowledge- Understand the basic concepts, fundamental principles and experimental findings and the scientific theories related to food technology, food science and Food technology & engineering and its other fields related to the program.
CO1: Students will get knowledge about the importance of food safety and the morphology of micro-organisms.
CO6 Students will learn about important microorganisms used in food processing industry.
CO7: Students will learn about growth curve.

PSO2 Communication Skills - Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.
CO4: Student will learn about the different types of hazards

PSO3: Critical Thinking- Propose novel idea sin explaining the scientific data, facts and figures related to science and technology**.**
CO2: Students will have a thorough understanding of various factors responsible for food spoilage.
CO5: Students will get knowledge about accreditation and auditing
CO7: Students will learn about growth curve.

PSO4: Analytical reasoning and problem solving To unable the students with good scientific and engineering knowledge so as to comprehend, design and create food products and devices for food industry and provide solutions for the challenges in the food industry as well as in the agriculture.
CO1: Students will get knowledge about the importance of food safety and morphology of micro-organisms.
CO7: Students will learn about growth curve.

PSO5: Sense of Inquiry Curiously ask relevant questions for better understanding of fundamental concepts and principles, scientific theories and applications related to the study.
CO2: Students will have a thorough understanding of various factors responsible for food spoilage.
CO4: Student will learn about the different types of hazards
CO5: Students will get knowledge about accreditation and auditing
CO6 Students will learn about important microorganisms used in food processing industry.
CO7: Students will learn about growth curve.

PSO6: Use of modern tools operate modern tools, equipment, instrument and laboratory techniques to perform the experiments and write the programmes in the different languages.

CO2: Students will have a thorough understanding of various factors responsible for food spoilage.
CO5: Students will get knowledge about accreditation and auditing
CO7: Students will learn about growth curve.

PSO7: Research skills Understand how to design, collect, analyze, interpret and evaluate information/data that is relevant to food technology.
CO2: Students will have a thorough understanding of various factors responsible for food spoilage.

PSO8: Application of knowledge Develop a scientific outlook and apply the knowledge with respect to food technology.
CO4: Student will learn about the different types of hazards
CO5: Students will get knowledge about accreditation and auditing

PSO9: Ethical awareness to train students in professional and ethical attitude, effective communication skills, team work skills, and multidisciplinary approaches related to food technology and engineering.
CO1: Students will get knowledge about the importance of food safety and morphology of micro-organisms.

PSO10: Team Work understand the basic concepts, fundamental principles and experimental findings and the scientific theories related to food technology, food science and food technology and engineering and its other fields related to the programme.
CO1: Students will get knowledge about the importance of food safety and morphology of micro-organisms.
CO5: Students will get knowledge about accreditation and auditing
CO6 Students will learn about important microorganisms used in food processing industry.

PSO11: Environmental sustainability Develop various communication skills such and reading, listening and speaking skills to express ideas and views clearly and effectively.
CO4: Student will learn about the different types of hazards

PSO12: Lifelong learning Propose novel ideas in explain the scientific data, fact and figures related to science and technology.
CO2: Students will have a thorough understanding of various factors responsible for food spoilage.
CO3: The students will know the important microorganisms used in food processing industry.

Topics and Learning Points

Unit-I: Introduction to Food safety **7 Periods**

Definition, Introduction, food safety and hazards, Types of hazards, biological, chemical, physical hazards, Factors affecting Food Safety, Importance of Safe Foods

Unit-II: Food Quality Management Tools **8 Periods**

Basic concept, Prerequisites- GHPs ,GMPs, SOPs etc, HACCP, ISO series, TQM - concept and need for quality, components of TQM, Role of food safety officer & auditor, Role of food analysts

Unit-III Food Safety and food Microbiology **7 Periods**

Introduction to food microbiology, Historical Contribution of various scientists, scope of microbiology in food, relation between food safety and food microbiology, Types of cell – Prokaryotic & Eukaryotic cell.

Unit-IV Food microbiology and public health **8 Periods**

Food in health and diseases- Description of foodborne illness, Significance of foodborne, Risk factor in the emergence of foodborne illness, control of foodborne disease outbreaks

References:

- Food microbiology (IVth edition) - William C. Frazier and Dennis C. Westoff- Tata McGraw Hill Pub. Co. Ltd, New Delhi, 1995)
- Basic food microbiology-George G. Banwart (CBS publishers & distributors, New Delhi, 1987)
- Food microbiology- M. R. Adams & M. O. Moss (New Age International (P). Ltd. 2000)
- Jay, James M. Modern Food Microbiology, CBS Publication, New Delhi, 2000

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

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

Programme Code **:** FTR

Class **:** F.Y B.Voc.

Semester *I*

Course Type **:** DSC-II (General)

Course Code **:** FTR-104-MJM

Course Title **:** Practicals of Food Safety quality management

No. of Credits *:02*

No. of Teaching Hours 30

Learning Objectives:

1. To learn about the basic laboratory safety practices.
2. To learn about maintaining personnel hygiene in food processing area.
3. To study the safety measures of laboratory instruments, material & glasswares.
4. To study the safety measures of various laboratory chemicals.
5. To learn importance of sanitation and sterilization in food preparation.
6. To study important microorganisms in food.
7. To study quality analysis of water.

Course Outcomes:

CO1: Students will get knowledge about the safety laboratory practices.
CO2: Students will learn about safety measures of various laboratory chemicals.
CO3: Students will have a thorough understanding of different microorganisms.
CO4: The students will know the cultivation of microbes by using various food samples.
CO5: Student will learn about importance of surface sanitation.
CO6: Students will learn about morphology of bacteria.
CO7: The students will know about the quality analysis of water.

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

Justification for the mapping

PSO1: Disciplinary knowledge- Understand the basic concepts, fundamental principles and experimental findings and the scientific theories related to food technology, food science and Food technology & engineering and its other fields related to the program.
CO1: Students will get knowledge about the safety laboratory practices.

CO6: Students will learn about morphology of bacteria.
CO7: The students will know about the quality analysis of water.

PSO2: Communication Skills - Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.
CO4: The students will know the cultivation of microbes by using various food samples.

PSO3: Critical Thinking- Propose novel idea sin explaining the scientific data, facts and figures related to science and technology**.**
CO2: Students will learn about safety measures of various laboratory chemicals.
CO5: Student will learn about importance of surface sanitation.
CO7: The students will know about the quality analysis of water.

PSO4: Analytical reasoning and problem solving To unable the students with good scientific and engineering knowledge so as to comprehend, design and create food products and devices for food industry and provide solutions for the challenges in the food industry as well as in the agriculture.
CO2: Students will learn about safety measures of various laboratory chemicals.
CO7: The students will know about the quality analysis of water.

PSO5: Sense of Inquiry Curiously ask relevant questions for better understanding of fundamental concepts and principles, scientific theories and applications related to the study.
CO2: Students will learn about safety measures of various laboratory chemicals.
CO4: The students will know the cultivation of microbes by using various food samples.
CO5: Student will learn about importance of surface sanitation.
CO6: Students will learn about morphology of bacteria.
CO7: The students will know about the quality analysis of water.

PSO6: Use of modern tools operate modern tools, equipment, instrument and laboratory techniques to perform the experiments and write the programmes in the different languages.
CO2: Students will learn about safety measures of various laboratory chemicals.
CO5: Student will learn about importance of surface sanitation.
CO7: The students will know about the quality analysis of water.

PSO7: Research skills Understand how to design, collect, analyze, interpret and evaluate information/data that is relevant to food technology.
CO2: Students will learn about safety measures of various laboratory chemicals.

PSO8: Application of knowledge Develop a scientific outlook and apply the knowledge with respect to food technology.
CO4: The students will know the cultivation of microbes by using various food samples.
CO5: Student will learn about importance of surface sanitation.

PSO9: Ethical awareness to train students in professional and ethical attitude, effective communication skills, team work skills, and multidisciplinary approaches related to food technology and engineering.
CO1: Students will get knowledge about the safety laboratory practices.

PSO10: Team Work understand the basic concepts, fundamental principles and experimental findings and the scientific theories related to food technology, food science and food technology and engineering and its other fields related to the programme.
CO1: Students will get knowledge about the safety laboratory practices.
CO5: Student will learn about importance of surface sanitation.
CO6: Students will learn about morphology of bacteria.

PSO11: Environmental sustainability. Develop various communication skills such and reading, listening and speaking skills to express ideas and views clearly and effectively.
CO4: The students will know the cultivation of microbes by using various food samples.

PSO12: Lifelong learning Propose novel ideas in explain the scientific data, fact and figures related to science and technology.
CO2: Students will learn about safety measures of various laboratory chemicals.
CO3: Students will have a thorough understanding of different microorganisms.

Topics and Learning Points

Sr. No.	Title of Practical	Credits
1.	Introduction to food safety practices	2P
2.	Introduction to basic laboratory safety measures	2P
3.	Assessment of personal hygiene	2P
4.	Introduction to basic material & glass wears	2P
5.	Introduction to basic laboratory instruments	2P
6.	To Study of aseptic techniques.	2P
7.	Preparation cleaning & sterilization of glass wear.	2P
8.	To study Morphology of bacteria.	2P
9.	To study the important microorganisms used in food industry.	2P
10.	To study various sampling techniques of food sample	2P
11.	Assessment of surface sanitation by swab method	2P
12.	Assessment of surface sanitation by rinse method	2P
13.	Water quality analysis A. Physicochemical analysis	2P
14.	Water quality analysis B. Microbiological analysis	2P
15.	Visit to Food Microbiological laboratory and report preparation.	2P

References:

- Food microbiology (IVth edition) - William C. Frazier and Dennis C. Westoff- Tata McGraw Hill Pub. Co. Ltd, New Delhi, 1995)
- Basic food microbiology-George G. Banwart (CBS publishers & distributors, New Delhi, 1987)
- Food microbiology- M. R. Adams & M. O. Moss (New Age International (P). Ltd. 2000)
- Jay, James M. Modern Food Microbiology, CBS Publication, New Delhi, 2000
- Introduction to Microbiology, M.H.Gajbhiye& S.J. Sathe et al, Career Publications, Nashik, 2015.

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

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

Programme Code **:** FTR

Class **:** F.Y B.Voc.

Semester *I*

Course Type **:** DSC-III

Course Code **:** FTR-105-MJM

CourseTitle **:** Food Science-I

No.ofCredits *:02*

Learning Objectives:

No.ofTeachingHours 30

1. To make students aware about scope and opportunities in food processing sector.
2. To make students aware of different functions of food.
3. To make students aware about role of various food groups human diet.
4. To make students understand the nutritive value of foods.
5. To make student understand basic principles of cooking and its effect on different foods.
6. To study about the composition of different food groups.
7. To study about Toxins present in foods and its elimination.

Course Outcomes:

CO 1: To make students aware about scope and opportunities in food processing sector.
CO 2: To make students aware of different functions of food.
CO 3: To make students aware about role of various food groups human diet.
CO 4: To make students understand the nutritive value of foods.
CO 5: To make student understand basic principles of cooking and its effect on different foods.
CO 6: To study about the composition of different food groups.
CO 7: To study about Toxins present in foods and its elimination.

CO/ PO	PO1	PO2	PO3	PO4	PO5	P O6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	2	-	-	-	-	2	-	-
CO2	2	-	-	2	2	-	2	-	-	2	-	5
CO3	2	-	-	6	-	6	2	2	-	4	-	-
CO4	1	3	3	2	-	5	-	-	-	2	-	-
CO5	-	-	-	6	6	5	4	2	-	2	-	2
CO6	1	-	2	4	3	6	5	-	-	2	3	-
CO7	-	-	3	6	-	7	5	-	2	4	-	-

Justification for the mapping

PSO1: Disciplinary knowledge- Understand the basic concepts, fundamental principles and experimental findings and the scientific theories related to food technology, food science and Food technology & engineering and its other fields related to the program.
CO 1: To make students aware about scope and opportunities in food processing sector.
CO 2: To make students aware of different functions of food.
CO 3: To make students aware about role of various food groups human diet.
CO 4: To make students understand the nutritive value of foods.
CO 6: To study about the composition of different food groups.

PSO2: Communication Skills - Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.
CO 4: To make students understand the nutritive value of foods.

PSO3: Critical Thinking- Propose novel idea sin explaining the scientific data, facts and figures related to science and technology**.**
CO 4: To make students understand the nutritive value of foods.
CO 6: To study about the composition of different food groups.
CO 7: To study about Toxins present in foods and its elimination.

PSO4: Analytical reasoning and problem solving To unable the students with good scientific and engineering knowledge so as to comprehend, design and create food products and devices for food industry and provide solutions for the challenges in the food industry as well as in the agriculture.
CO 2: To make students aware of different functions of food.
CO 3: To make students aware about role of various food groups' in human diet.

CO 4: To make students understand the nutritive value of foods.
CO 5: To make student understand basic principles of cooking and its effect on different foods.
CO 6: To study about the composition of different food groups.
CO 7: To study about Toxins present in foods and its elimination.

PSO5: Sense of Inquiry Curiously ask relevant questions for better understanding of fundamental concepts and principles, scientific theories and applications related to the study.
CO 1: To make students aware about scope and opportunities in food processing sector.
CO 2: To make students aware of different functions of food.
CO 5: To make student understand basic principles of cooking and its effect on different foods.
CO 6: To study about the composition of different food groups.

PSO6: Use of modern tools operate modern tools, equipment, instrument and laboratory techniques to perform the experiments and write the programmes in the different languages.
CO 3: To make students aware about role of various food groups human diet.
CO 4: To make students understand the nutritive value of foods.
CO 5: To make student understand basic principles of cooking and its effect on different foods.
CO 6: To study about the composition of different food groups.
CO 7: To study about Toxins present in foods and its elimination.

PSO7: Research skills Understand how to design, collect, analyze, interpret and evaluate information/data that is relevant to food technology.
CO 2: To make students aware of different functions of food.
CO 3: To make students aware about role of various food groups human diet.
CO 5: To make student understand basic principles of cooking and its effect on different foods.
CO 6: To study about the composition of different food groups.
CO 7: To study about Toxins present in foods and its elimination.

PSO8: Application of knowledge Develop a scientific outlook and apply the knowledge with respect to food technology.
CO 3: To make students aware about role of various food groups human diet.
CO 5: To make student understand basic principles of cooking and its effect on different foods.

PSO9: Ethical awareness To train students in professional and ethical attitude, effective communication skills, team work skills, and multidisciplinary approaches related to food technology and engineering.
CO 7: To study about Toxins present in foods and its elimination.

PSO10: Team Work understand the basic concepts, fundamental principles and experimental findings and the scientific theories related to food technology, food science and food technology and engineering and its other fields related to the programme.
CO 1: To make students aware about scope and opportunities in food processing sector.
CO 2: To make students aware of different functions of food.
CO 3: To make students aware about role of various food groups human diet.
CO 4: To make students understand the nutritive value of foods.
CO 5: To make student understand basic principles of cooking and its effect on different foods.

CO 6: To study about the composition of different food groups.
CO 7: To study about Toxins present in foods and its elimination.

PSO 11: Environmental sustainability Develop various communication skills such and reading, listening and speaking skills to express ideas and views clearly and effectively.
CO 6: To study about the composition of different food groups.

PSO 12 Lifelong learning Propose novel ideas in explain the scientific data, fact and figures related to science and technology.
CO 2: To make students aware of different functions of food.
CO 5: To make student understand basic principles of cooking and its effect on different foods.

Topics and Learning Points

Unit-1: Introduction to Food science **07 Periods**
Scope and Opportunities in Food Industries, Definition, Functions of food, Food groups, mode of heat transfer, Cooking- objectives, Preparation & cooking methods

Unit-2: Cereals & Pulses **08 Periods**
Cereals: Structure, Composition& nutritive value of Wheat, Rice & Maize, Cereal Cookery, Role of cereals in cookery**,** other important Cereals, Textured Vegetable Protein (TVP) Sources and Advantage
Pulses -Composition & Nutritive value, toxic constituents & its elimination, Germination and its Changes, Pulse cookery, Role of pulses in cookery

Unit-3: Fruits & Vegetables **08 Periods**
Fruits- Classification**,** Sources, Composition and Nutritive value, ripening of fruits, Browning of fruits
Vegetables- Classification, Composition and Nutritive value, Vegetable cookery, Role of vegetable in cookery

Unit -4: Nuts, Oilseeds, Spices & Aromatics **07 Periods**
Composition & Nutritive value, important nuts & oilseeds, toxins, Role of nuts & oilseeds in cookery, Classification, General functions of spices, Herbs, role of spices in cookery.

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)

CBCS Syllabus as per NEP 2020 for F.Y B.Voc. Food Technology & Research (2025 Pattern)

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

Programme Code **:** FTR

Class **:** F.Y B.Voc.

Semester *I*

Course Type **: Major**

Course Code **: FTR-106-MJM**

Course Title **:** Practicals of Food Science-I

No.ofCredits *:02*

No. of Teaching Hours **:** 30

Learning Objectives:

1. To make students aware about scope and opportunities in food processing sector.
2. To make students aware of different functions of food.
3. To make students aware about role of various food groups human diet.
4. To make students understand the nutritive value of foods.
5. To make student understand basic principles of cooking and its effect on different foods.
6. To study about the composition of different food groups.
7. To study about Toxins present in foods and its elimination.

Course Outcomes:

CO 1: To make students aware about scope and opportunities in food processing sector.
CO 2: To make students aware of different functions of food.
CO 3: To make students aware about role of various food groups human diet.
CO 4: To make students understand the nutritive value of foods.
CO 5: To make student understand basic principles of cooking and its effect on different foods.
CO 6: To study about the composition of different food groups.
CO 7: To study about Toxins present in foods and its elimination.

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

CO3	**2**	**-**	**-**	**6**	**-**	**6**	**2**	**2**	**-**	**4**	**-**	**-**
CO4	**1**	**3**	**3**	**2**	**-**	**5**	**-**	**-**	**-**	**2**	**-**	**-**
CO5	**-**	**-**	**-**	**6**	**6**	**5**	**4**	**2**	**-**	**-**	**-**	**2**
CO6	**1**	**-**	**2**	**4**	**3**	**6**	**5**	**-**	**-**	**2**	**3**	**-**
CO7	**-**	**-**	**3**	**6**	**-**	**7**	**5**	**-**	**2**	**4**	**-**	**-**

Justification for the mapping

PSO1: Disciplinary knowledge- Understand the basic concepts, fundamental principles and experimental findings and the scientific theories related to food technology, food science and Food technology & engineering and its other fields related to the program.
CO 1: To make students aware about scope and opportunities in food processing sector.
CO 2: To make students aware of different functions of food.
CO 3: To make students aware about role of various food groups human diet.
CO 4: To make students understand the nutritive value of foods.
CO 6: To study about the composition of different food groups.

PSO2: Communication Skills - Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.
CO 4: To make students understand the nutritive value of foods.

PSO3: Critical Thinking- Propose novel idea sin explaining the scientific data, facts and figures related to science and technology**.**
CO 4: To make students understand the nutritive value of foods.
CO 6: To study about the composition of different food groups.
CO 7: To study about Toxins present in foods and its elimination.

PSO4: Analytical reasoning and problem solving To unable the students with good scientific and engineering knowledge so as to comprehend, design and create food products and devices for food industry and provide solutions for the challenges in the food industry as well as in the agriculture.
CO 2: To make students aware of different functions of food.
CO 3: To make students aware about role of various food groups human diet.
CO 4: To make students understand the nutritive value of foods.
CO 5: To make student understand basic principles of cooking and its effect on different foods.
CO 6: To study about the composition of different food groups.
CO 7: To study about Toxins present in foods and its elimination.

PSO5: Sense of Inquiry Curiously ask relevant questions for better understanding of fundamental concepts and principles, scientific theories and applications related to the study.
CO 1: To make students aware about scope and opportunities in food processing sector.
CO 2: To make students aware of different functions of food.
CO 5: To make student understand basic principles of cooking and its effect on different foods.
CO 6: To study about the composition of different food groups.

PSO6: Use of modern tools operate modern tools, equipment, instrument and laboratory techniques to perform the experiments and write the programmes in the different languages.
CO 3: To make students aware about role of various food groups human diet.
CO 4: To make students understand the nutritive value of foods.
CO 5: To make student understand basic principles of cooking and its effect on different foods.
CO 6: To study about the composition of different food groups.

PSO7: Research skills Understand how to design, collect, analyze, interpret and evaluate information/data that is relevant to food technology.
CO 2: To make students aware of different functions of food.
CO 3: To make students aware about role of various food groups human diet.
CO 5: To make student understand basic principles of cooking and its effect on different foods.
CO 6: To study about the composition of different food groups.
CO 7: To study about Toxins present in foods and its elimination.

PSO8: Application of knowledge Develop a scientific outlook and apply the knowledge with respect to food technology.
CO 3: To make students aware about role of various food groups human diet.
CO 5: To make student understand basic principles of cooking and its effect on different foods.

PSO9: Ethical awareness to train students in professional and ethical attitude, effective communication skills, team work skills, and multidisciplinary approaches related to food technology and engineering.
CO 7: To study about Toxins present in foods and its elimination.

PSO10: Team Work understand the basic concepts, fundamental principles and experimental findings and the scientific theories related to food technology, food science and food technology and engineering and its other fields related to the programme.
CO 2: To make students aware of different functions of food.
CO 3: To make students aware about role of various food groups human diet.
CO 4: To make students understand the nutritive value of foods.
CO 6: To study about the composition of different food groups.
CO 7: To study about Toxins present in foods and its elimination.

PSO11: Environmental sustainability Develop various communication skills such and reading, listening and speaking skills to express ideas and views clearly and effectively.
CO 6: To study about the composition of different food groups.

PSO12: Lifelong learning Propose novel ideas in explain the scientific data, fact and figures related to science and technology.
CO 2: To make students aware of different functions of food.
CO 5: To make student understand basic principles of cooking and its effect on different foods.

Topics and Learning Points

Sr. No.	Title of the practicals	Credits
1.	Study of different cooking methods	2P
2.	Preparation of rice flakes	2P
3.	Preparation of soya nuts	2P
4.	Extraction of edible oil	1P
5.	Preparation of Coated Masala Groundnuts	1P
6.	Study of Germination/Malting	1P
7.	Preparation of Garlic/Ginger Paste	1P
8.	Preparation of condensed milk	2P
9.	Preparation of chips & wafers	2P
10.	Preparation of instant soup premix	1P
11.	Preparation of curry powder	1P
12.	Preparation of turmeric powder	1P
13.	Preparation of powdered drinks	1P
14.	Visit to industry	1P
15.	Preparation of report on industrial visit & presentation	2P

References:

1. Food Science By Potter
2. Food Science 3rd edition By B. Shrilakshmi
3. Fruit & Vegetable Preservation By Srivastava Kumar
4. Food, Facts and Principles By Shakuntala Manay
5. Food Processing and Preservation By G. Subbulakshmi, Shobha A. Udipi
6. Food Processing Technology 2nd edition By P. J. Fellows

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

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

Programme Code **:** FTR

Class **:** F.Y B.Voc.

Semester *I*

Course Type **:** Open Elective (OE)

Course Code **:** FTR-107-OE

Course Title **:** Basics of Food Science

No.ofCredits *:02*

No.ofTeachingHours 30

LearningObjectives:

1. To learn about the scope of Food Preservation of India
2. To study the functions of food
3. To study about the Indian Standards & International Organization.
4. To learn about energy metabolism & balance diet.

Course Outcomes:

CO1: Students will get knowledge about the food science & technology.
CO2: Students will have a thorough understanding of Indian Standards & International Organization.
CO3: The students will know the classification & health benefits of food.
CO4: Student will learn about the basic of nutrients.
CO5: Students will learn about various regulations related to food science.
CO6: Students will learn about various laws related to food science.
CO7: Students will get knowledge about food processing technology.

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

Justification for the mapping

PSO1: Disciplinary knowledge- Understand the basic concepts, fundamental principles and experimental findings and the scientific theories related to food technology, food science and Food technology & engineering and its other fields related to the program.
CO1: Students will get knowledge about the food science & technology.
CO6: Students will learn about various laws related to food science.
CO7: Students will get knowledge about food processing technology.

PSO2: Communication Skills - Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.
CO4: Student will learn about the basic of nutrients.

PSO3 Critical Thinking- Propose novel idea sin explaining the scientific data, facts and figures related to science and technology**.**
CO2: Students will have a thorough understanding of Indian Standards & International Organization.
CO5: Students will learn about various regulations related to food science.
CO7: Students will get knowledge about food processing technology.

PSO4: Analytical reasoning and problem solving To unable the students with good scientific and engineering knowledge so as to comprehend, design and create food products and devices for food industry and provide solutions for the challenges in the food industry as well as in the agriculture.
CO2: Students will have a thorough understanding of Indian Standards & International Organization.
CO7: Students will get knowledge about food processing technology.

PSO5: Sense of Inquiry Curiously ask relevant questions for better understanding of fundamental concepts and principles, scientific theories and applications related to the study.
CO2: Students will have a thorough understanding of Indian Standards & International Organization.
CO4: Student will learn about the basic of nutrients.
CO5: Students will learn about various regulations related to food science.
CO6: Students will learn about various laws related to food science.
CO7: Students will get knowledge about food processing technology.

PSO6: Use of modern tools operate modern tools, equipment, instrument and laboratory techniques to perform the experiments and write the programmes in the different languages.
CO2: Students will have a thorough understanding of Indian Standards & International Organization.
CO5: Students will learn about various regulations related to food science.
CO7: Students will get knowledge about food processing technology.

PSO7: Research skills Understand how to design, collect, analyze, interpret and evaluate information/data that is relevant to food technology.

CO2: Students will have a thorough understanding of Indian Standards & International Organization.

PSO8: Application of knowledge develop a scientific outlook and apply the knowledge with respect to food technology.
CO4: Student will learn about the basic of nutrients.
CO5: Students will learn about various regulations related to food science.

PSO9: Ethical awareness to train students in professional and ethical attitude, effective communication skills, team work skills, and multidisciplinary approaches related to food technology and engineering.
CO2: Students will have a thorough understanding of Indian Standards & International Organization.
CO6: Students will learn about various laws related to food science.

PSO10: Team Work understand the basic concepts, fundamental principles and experimental findings and the scientific theories related to food technology, food science and food technology and engineering and its other fields related to the programme.
CO1: Students will get knowledge about the food science & technology.
CO5: Students will learn about various regulations related to food science.
CO6: Students will learn about various laws related to food science.

PSO11: Environmental sustainability Develop various communication skills such and reading, listening and speaking skills to express ideas and views clearly and effectively.
CO4: Student will learn about the basic of nutrients.

PSO12: Lifelong learning Propose novel ideas in explain the scientific data, fact and figures related to science and technology.
CO2: Students will have a thorough understanding of Indian Standards & International Organization.
CO3: The students will know the classification & health benefits of food.
CO5: Students will learn about various regulations related to food science.
CO6: Students will learn about various laws related to food science.

Topics and Learning Points

Unit-1: History of Food Processing in India **07 Periods**

1.1 Introduction, History

1.2 Scope of Food Preservation of India

Unit-II: Introduction to food processing& Technology **07 Periods**

2.1 Definition of food, food science & technology and its objectives

2.2 Acceptability of food, functions of food

Unit-III: Nutrients & function food **08Periods**

3.1 Basic of nutrients- Macro & Micronutrients, energy metabolism, balance diet

3.2 Function of food- classification, health benefits and its examples

Unit-IV: Food law & Regulations **08 Periods**

4.1 standards - BIS, AGMARK, FSSAI, International Standards, CAC & ISO

4.2 International Organization- WHO, FAO, WTO

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

CBCS Syllabus as per NEP 2020 for F.Y B.Voc. Food Technology & Research (2025 Pattern)

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

Programme Code **:** FTR

Class **:** F.Y B.Voc.

Semester *I*

Course Type **:** Skill Enhancement Course (SEC)

Course Code **:** FTR-108-SEC

Course Title **:** Culinary Arts

No.ofCredits *:02*

No.ofTeachingHours 30

Learning Objectives:

1 To make students aware about importance of presentation skills in food processing sector.

2 To make students aware about various equipments in artistic presentation of foods and

their handling.

3 To make students aware about various utensils in artistic presentation of foods and their handling.
4 To make various products with different colours and shape to increase its attractiveness.
5 To make students prepare various desserts with attractive shape and colour.
6 To make students prepare various healthy and colourful soups.
7 To enhance students fruits and vegetable carving skills.

Course Outcomes:

CO1: To make students aware about importance of presentation skills in food processing sector.
CO2: To make students aware about various equipments in artistic presentation of foods and their handling.

CO3: To make students aware about various utensils in artistic presentation of foods and their handling.
CO4: To make various products with different colours and shape to increase its attractiveness.
CO5: To make students prepare various desserts with attractive shape and colour.
CO6: To make students prepare various healthy and colourful soups
CO7: To enhance students fruits and vegetable carving skills.

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	2	-	-	-	-	-	-	-
CO2	2	-	-	2	2	-	2	-	-	2	-	5
CO3	2	-	-	6	-	6	2	2	-	4	-	-
CO4	1	3	3	2	-	5	-	-	-	2	-	-
CO5	-	-	-	6	6	5	4	2	-	-	-	2
CO6	1	-	2	4	3	6	5	-	-	2	3	-
CO7	-	-	3	6	-	7	5	-	2	4	-	-

Justification for the mapping

PSO1: Disciplinary knowledge- Understand the basic concepts, fundamental principles and experimental findings and the scientific theories related to food technology, food science and Food technology & engineering and its other fields related to the program.
CO1: To make students aware about importance of presentation skills in food processing sector.
CO2: To make students aware about various equipments in artistic presentation of foods and their handling.
CO3: To make students aware about various utensils in artistic presentation of foods and their handling.
CO4: To make various products with different colours and shape to increase its attractiveness.

PSO2: Communication Skills - Develop various communication skills such as reading, listening and speaking skills to express ideas and views clearly and effectively.
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CO6: To make students prepare various healthy and colourful soups
CO7: To enhance students fruits and vegetable carving skills.

PSO5: Sense of Inquiry Curiously ask relevant questions for better understanding of fundamental concepts and principles, scientific theories and applications related to the study.
CO1: To make students aware about importance of presentation skills in food processing sector.
CO2: To make students aware about various equipments in artistic presentation of foods and their handling.
CO5: To make students prepare various desserts with attractive shape and colour.
CO6: To make students prepare various healthy and colourful soups

PSO6: Use of modern tools operate modern tools, equipment, instrument and laboratory techniques to perform the experiments and write the programmes in the different languages.
CO3: To make students aware about various utensils in artistic presentation of foods and their handling.
CO4: To make various products with different colours and shape to increase its attractiveness.
CO5: To make students prepare various desserts with attractive shape and colour.
CO6: To make students prepare various healthy and colourful soups
CO7: To enhance students fruits and vegetable carving skills.

PSO7: Research skills Understand how to design, collect, analyze, interpret and evaluate information/data that is relevant to food technology.
CO2: To make students aware about various equipments in artistic presentation of foods and their handling.
CO3: To make students aware about various utensils in artistic presentation of foods and their

handling.
CO5: To make students prepare various desserts with attractive shape and colour.
CO6: To make students prepare various healthy and colourful soups
CO7: To enhance students fruits and vegetable carving skills.

PSO8: Application of knowledge Develop a scientific outlook and apply the knowledge with respect to food technology.
CO3: To make students aware about various utensils in artistic presentation of foods and their handling.
CO5: To make students prepare various desserts with attractive shape and colour.

PSO9: Ethical awareness to train students in professional and ethical attitude, effective communication skills, team work skills, and multidisciplinary approaches related to food technology and engineering.
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PSO12: Lifelong learning Propose novel ideas in explain the scientific data, fact and figures related to science and technology.
CO2: To make students aware about various equipments in artistic presentation of foods and their handling.
CO5: To make students prepare various desserts with attractive shape and colour.

Topics and Learning Points

Sr.	Title of practical	Credits

No.		
1.	Introduction to equipments required in culinary arts.	2P
2.	Introduction to utensils required in culinary arts.	2P
3.	Preparation of sikh/vegetable kabab.	2P
4.	Preparation of Smoked products (Dum Biryani)	2P
5.	Preparation of Chirote	2P
6.	Preparation of coated products.	2P
7.	Preparation of cheese cake.	2P
8.	Preparation of steamed products (steam modak/momos)	2P
9.	Preparation of Mocktails	2P
10.	Preparation of various salads	2P
11.	Preparation of soups.	2P
12.	Preparation of various types of desserts-Kunafa	2P
13.	To study and prepare various carving models from fruits and vegetables.	2P
14.	To study plate presentation techniques of food products.	2P
15.	Visit to Food service establishment and visit report writing.	2P

References:

- The Food Lab: Better Home Cooking Through Science" by J. Kenji López-Alt
- On Food and Cooking: The Science and Lore of the Kitchen (Hardcover) by Harold McGee
- The Professional Chef by Culinary Institute of America.

Theory Paper No- ENG-181-AEC-Functional English

Maximum Marks: 30 **Credits: 2**
Teaching Period: 2 /week **Teaching Load: 30 Theory Period/Semester**

Theory Paper No- FTR-185-VEC-Digital & Technology Solutions

Maximum Marks: 30 **Credits: 2**
Teaching Period: 2/week **Teaching Load: 30 Theory Period/Semester**

Theory Paper No- 139-Co-curricular Course (CC)