



**Anekant Education Society's**

**Tuljaram Chaturchand College, Baramati**

**(Autonomous)**

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

**(Faculty of Food Technology & Research)**

**CBCS Syllabus**

**SY B.Voc (Food Technology) Semester -IV**

**For Department Food Technology & Research**

**Tuljaram Chaturchand College, Baramati**

**Choice Based Credit System Syllabus (2023 Pattern)**

**(As Per NEP 2020)**

**To be implemented from Academic Year 2024-2025**

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

## **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 21<sup>st</sup> 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 20<sup>th</sup> April and 16<sup>th</sup> May 2023, and the Circular issued by SPPU, Pune on 31<sup>st</sup> 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

From 2022-23 to 2024-25

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

## Information

- 1. One semester** = 15 weeks (12 weeks actual teaching and 3 weeks for internal evaluation, tutorials, problem solutions, student's difficulty solution, etc.)
- 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 Courses | Minor Courses          | 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        |
| <b>VII and VIII Sem honours degree with major</b>    |                        |                        |                        |             |          |
| VII  | 5 theory + 2 Practical | 1 Theory + 1 Practical | 0                      | 0           | 0        |
| VIII   | 5 theory + 2 Practical | 1 Theory + 1 Practical | 0                      | 0           | 0        |
| <b>VII and VIII Sem honours degree with research</b> |                        |                        |                        |             |          |
| 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 (B.Voc. Food Technology & Research) Part-II (2023 Pattern as per NEP-2020)**

| Sem                            | Course Type                     | Course Code  | Course Name                         | Theory/Practical     | Credits   |
|--------------------------------|---------------------------------|--------------|-------------------------------------|----------------------|-----------|
| III                            | Major Mandatory                 | FTR- 201-MJM | Processing of Fruits and vegetables | Theory               | 02        |
|                                | Major Mandatory                 | FTR-202-MJM  | Food Chemistry                      | Theory               | 02        |
|                                | Major Mandatory                 | FTR-203-MJM  | Processing of Fruits and vegetables | Practical            | 02        |
|                                | Major Mandatory                 | FTR-204-MJM  | Food Chemistry                      | Practical            | 02        |
|                                | Minor                           | FTR-211-MN   | Plantation crops                    | Theory               | 02        |
|                                | Minor                           | FTR-212-MN   | Plantation crops                    | Practical            | 02        |
|                                | Open Elective(OE)               | FTR-216-OE   | Preservation Technology             | Theory               | 02        |
|                                | Vocational Skill Course(VSC)    | FTR-221-VSC  | Food Analytical techniques          | Practical            | 02        |
|                                | Ability Enhancement Course(AEC) | FTR-231- AEC | Marathi/Hindi/Sanskrit              | Theory               | 02        |
|                                | Co-curricular Course(CC)        | FTR-239-CC   | To be selected from the Basket      | Theory/<br>Practical | 02        |
|                                | Field Project (FP)              | FTR-235-FP   | Field Project (FP)                  | Practical            | 02        |
| Generic IKS Course (IKS)       | FTR-245-IKS                     | Common       | Theory                              | 02                   |           |
| <b>Total Credits Semester-</b> |                                 |              |                                     |                      | <b>24</b> |
| <b>III</b>                     |                                 |              |                                     |                      |           |
| IV                             | Major Mandatory                 | FTR-251-MJM  | Food Engineering                    | Theory               | 02        |
|                                | Major Mandatory                 | FTR-252-MJM  | Cereals & Pulses Technology         | Theory               | 02        |
|                                | Major Mandatory                 | FTR-253-MJM  | Food Engineering                    | Practical            | 02        |
|                                | Major Mandatory                 | FTR-254-MJM  | Cereals & Pulses Technology         | Practical            | 02        |
|                                | Minor                           | FTR-261-MN   | Beverage Technology                 | Theory               | 02        |
|                                | Minor                           | FTR-262-MN   | Beverage Technology                 | Practical            | 02        |
|                                | Open Elective(OE)               | FTR-266-OE   | Confectionery Technology            | Practical            | 02        |
|                                | Skill Enhancement Course(SEC)   | FTR-271-SEC  | Confectionery Technology            | Practical            | 02        |
|                                | Ability Enhancement Course(AEC) | FTR-281-ACE  | Marathi/Hindi/Sanskrit              | Theory               | 02        |
|                                | Co-curricular Course(CC)        | FTR-289-CC   | To be selected from the Basket      | Theory/<br>Practical | 02        |



|  |            |             |                        |            |           |           |
|--|------------|-------------|------------------------|------------|-----------|-----------|
| Community<br>Programme                         | Engagement | FTR-295-CEP | Community<br>Programme | Engagement | Practical | 02        |
| <b>Total Credits Semester-IV</b>               |            |             |                        |            |           | 22        |
| <b>Cumulative Credits Semester- III and IV</b> |            |             |                        |            |           | <b>44</b> |

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

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

**Programme Code** : FTR

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

*Semester* : *IV*

**Course Type** : Major Mandatory

**Course Code** : FTR-251-MJM

**Course Title** : Food Engineering

No. of Credits : 02

**No. of Teaching Hours** : 30

### Learning Objectives:

- To know basics of Food process engineering
- To develop knowledge and ability related identification, calculation, formulation and problem solving.
- To develop the skills related to scientific principles of Food process engineering.
- To study working of Food process techniques
- To study about concept of size reduction
- To learn about Newton law rheology

### Course Outcomes:

**CO1:** Students will have a thorough understanding of the basic principles of various unit operations and its applications in food processing.

**CO2:** The students will know to identify, calculate, formulate and solve problems of engineering and mass & energy balance.

**CO3:** The students will know the scientific principles in processing technology specific to the materials.

**CO4:** The students will know to operate food process techniques.

**CO5:** The students will learn about Newton law rheology

**CO6:** The students will study about concept of size reduction

**CO7:** The students will know various types of mechanical handling

## Topics and Learning Points

### Unit 1: Introduction to Food Engineering

**8 P**

- 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 P**

- 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 P**

- 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

**7P**

- 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:

1. 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.

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

## Justification for the mapping

### **PO1:- 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 have a thorough understanding of the basic principles of various unit operations and its applications in food processing.

**CO3:** The students will know the scientific principles in processing technology specific to the materials.

**CO5:** The students will learn about Newton law rheology

**CO6:** The students will study about concept of size reduction

### **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 to identify, calculate, formulate and solve problems of engineering and mass & energy balance.

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

**CO1:** Students will have a thorough understanding of the basic principles of various unit operations and its applications in food processing.

**CO2:** The students will know to identify, calculate, formulate and solve problems of engineering and mass & energy balance.

**CO6:** The students will study about concept of size reduction

**CO7:** The students will know various types of mechanical handling

### **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 in industry as well as in agriculture.**

**CO3:** The students will know the scientific principles in processing technology specific to the materials.

**CO5:** The students will learn about Newton law rheology

**CO6:** The students will study about concept of size reduction

### **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 the basic principles of various unit operations and its applications in food processing.

**CO2:** The students will know to identify, calculate, formulate and solve problems of engineering and mass & energy balance.

**CO3:** The students will know the scientific principles in processing technology specific to the materials.

**CO5:** The students will learn about Newton law rheology

**CO7:** The students will know various types of mechanical handling

### **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, etc.**

**CO1:** Students will have a thorough understanding of the basic principles of various unit operations and its applications in food processing.

**CO3:** The students will know the scientific principles in processing technology specific to the materials.

**CO6:** The students will study about concept of size reduction

**CO7:** The students will know various types of mechanical handling

**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 the basic principles of various unit operations and its applications in food processing.

**CO3:** The students will know the scientific principles in processing technology specific to the materials.

**CO5:** The students will learn about Newton law rheology

**CO6:** The students will study about concept of size reduction

**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 the basic principles of various unit operations and its applications in food processing.

**CO3:** The students will know the scientific principles in processing technology specific to the materials.

**CO6:** The students will study about concept of size reduction

**CO7:** The students will know various types of mechanical handling

**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 to operate food process techniques.

**CO6:** The students will study about concept of size reduction

**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 the basic principles of various unit operations and its applications in food processing.

**CO3:** The students will know the scientific principles in processing technology specific to the materials.

**CO5:** The students will learn about Newton law rheology

**CO6:** The students will study about concept of size reduction

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

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

**Programme Code** : FTR

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

*Semester* : *IV*

**Course Type** : Major Mandatory

**Course Code** : FTR-252-MJM

**Course Title** : Cereals & Pulses Technology

No. of Credits : 02

**No. of Teaching Hours** 30

### Learning Objectives:

- To understand the composition of cereal and pulses
- To understand the processing of cereal and pulse based product.
- To learn about milling of cereal and pulses.
- To develop different types of breakfast cereals
- To study different products of snack
- To learn about extrusion technology.

### Course Outcomes:

**CO1:** Students will have a thorough understanding the composition of cereal and pulses

**CO2:** The students will understand the processing of cereal and pulse based product.

**CO3:** The students will know about milling of cereal and pulses.

**CO4:** Students will develop different types of breakfast cereals

**CO5:** The students will know about study different products of snack

**CO6:** Students will know learn about extrusion technology

**CO7:** Students will know role of different types of Ready-to-Eat products.

### Topics and Learning Points

#### Unit-1: Technology of cereals-I

**7 Periods**

1.1 Wheat --Types, milling, flour grade, flour treatments (bleaching, maturing), flour for various purposes, technology of dough development.

1.2 Rice – Physico-chemical properties, milling (mechanical & solvent extraction of rice bran), parboiling, ageing of rice, utilization of by products.

1.3 Corn – Milling (wet & dry), cornflakes

#### Unit-2: Technology of Cereals-II

**8 Periods**

2.1 Barley- Milling (pearl barley, barley flakes & flour), beer preparation,

- 2.2 Oats – Milling (oatmeal, oat flour & oat flakes),
- 2.3 Sorghum and millets – Traditional & commercial milling (dry & wet)
- 2.4 Rye and triticale—milling (flour), uses,
- 2.5 Anti-nutritional Factors in Cereals and their removal

**Unit-3: Technology of Pulses**

**7 Periods**

- 3.1 Milling of pulses- Dry milling, wet milling, improved milling method, soaking, roasting, steaming and cooking, germination, parching,
- 3.2 Factors affecting cooking of legumes,
- 3.3 Anti-nutritional Factors in Pulses and their removal

**Unit-4: Breakfast cereals and Snack foods**

**8 Periods**

- 4.1 Introduction, history, present status,
- 4.2 Processing of hot serve cereals and ready –to –eat breakfast cereals, Flakes, shreds, granules, puffed cereals, sugar coated products, popped and puffed snacks,
- 4.3 Factors affecting their quality,
- 4.4 Convenience cereal foods, Durum wheat products and extrusion cooking

**References:**

1. Kent, Technology of Cereal, 5th Ed. Pergamon Press, 2003
2. Chakraborty., Post Harvest Technology of Cereals, Pulses and Oilseeds, revised ed., Oxford & IBH Publishing Co. Pvt Ltd, 1988
3. Marshall, Rice Science and Technology, Wadsworth Ed., Marcel Dekker, New York, 1994
4. Mathews, R.H. Ed. 1989. Legumes: Chemistry and Technology and Human Nutrition, Marcel Dekker, New York
5. Pomeranz, Y. Ed. 1978. Wheat: Chemistry and Technology. American Association Cereal chemist. St. Paul, Minnesota.
6. Pomeranz, Y. 1987. Modern Cereal Science and Technology, VCH, New York
7. Salunkhe, D.K., Kadam S.S. Ed. 1989. Handbook of World Food Legume: Chemistry, Processing and Utilization, CRC Press, Florida.
8. Salunkhe, D.K., Kadam S.S. and Austin, A. Ed. 1986. Quality of Wheat and Wheat Production Metropolitan Book Co. New Delhi

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

Justification for the mapping

**PO1:- Disciplinary Knowledge - Understand the basic concepts, fundamental principles and experimental findings and the scientific the ories related to food technology, food science and**

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

**CO1:**Students will have a thorough understanding of unit operations followed for raw form to an edible form of

cereals and legumes

**CO2:** The students will know the importance of various methods to identify any disorder in fresh commodities.

**CO3:** Students will know about emerging technologies related to harvesting of cereals, pulses and oil seeds

**CO5:** Students will learn different processed products of cereals, pulses and oil seeds

**CO6:** Students will know about extrusion and various extruded products

**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 methods to identify any disorder in fresh commodities.

**CO3:** Students will know about emerging technologies related to harvesting of cereals, pulses and oil seeds

**CO5:** Students will learn different processed products of cereals, pulses and oil seeds

**CO6:** Students will know about extrusion and various extruded products

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

**CO1:** Students will have a thorough understanding of unit operations followed for raw form to an edible form of cereals and legumes

**CO2:** The students will know the importance of various methods to identify any disorder in fresh commodities.

**CO5:** Students will learn different processed products of cereals, pulses and oil seeds

**CO7:** Students will know about importance of lipids, their extraction process and further processing

**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 in industry as well as in agriculture.**

**CO3:** Students will know about emerging technologies related to harvesting of cereals, pulses and oil seeds

**CO4:** Students will learn different milling processes and their working

**CO6:** To know about extrusion and various extruded products and their advantages.

**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 unit operations followed for raw form to an edible form of cereals and legumes

**CO2:** The students will know the importance of various methods to identify any disorder in fresh commodities.

**CO3:** Students will know about emerging technologies related to harvesting of cereals, pulses and oil seeds

**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, effecti**

**CO4:** Students will learn different milling processes and their working

**CO5:** Students will learn different processed products of cereals, pulses and oil seeds

**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 unit operations followed for raw form to an edible form of cereals and legumes

**CO4:** Students will learn different milling processes and their working

**CO5:**Students will learn different processed products of cereals, pulses and oil seeds

**CO1:**Students will have a thorough understanding of unit operations followed for raw form to an edible form of cereals and legumes

**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 unit operations followed for raw form to an edible form of cereals and legumes

**CO2:** The students will know the importance of various methods to identify any disorder in fresh commodities.

**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**

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

**CO1:**Students will have a thorough understanding of unit operations followed for raw form to an edible form of cereals and legumes

**CO2:** The students will know the importance of various methods to identify any disorder in fresh commodities.

**CO3:** Students will know about emerging technologies related to harvesting of cereals, pulses and oil seeds

**CO5:**Students will learn different processed products of cereals, pulses and oil seeds

**CO6:** Students will know about extrusion and various extrudes products

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

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

**Programme Code** : FTR

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

*Semester* IV

**Course Type** : Major Mandatory

**Course Code** : FTR-253-MJM

**Course Title** : Food Engineering

*No. of Credits* :02

**No. of Teaching Hours** 30

### **Learning Objectives:**

- To know basics of Food process engineering
- To develop knowledge and ability related identification, calculation, formulation and problem solving.
- To develop the skills related to scientific principles of Food process engineering.

- To study working of Food process techniques
- To study about concept of size reduction
- To learn about Newton law rheology

### Course Outcomes:

**CO1:** Students will have a thorough understanding of the basic principles of various unit operations and its applications in food processing.

**CO2:** The students will know to identify, calculate, formulate and solve problems of engineering and mass & energy balance.

**CO3:** The students will know the scientific principles in processing technology specific to the materials.

**CO4:** The students will know to operate food process techniques.

**CO5:** The students will learn about Newton law rheology

**CO6:** The students will study about concept of size reduction

**CO7:** The students will know various types of mechanical handling

### Topics and Learning Points

1. To determine velocity and speed of food material
2. To determine the force and momentum of material
3. To measure weight of food material
4. To study the heat and mass transfer.
5. To study the fluid mechanism of food product.
6. To study the types of separation techniques.
7. To study the working of boiler.
8. To determine the cooking properties of cereals.
9. To study the properties of food through microwave oven heating
10. To study the properties of milk.
11. To determine oil expansion and absorption characteristics of snack food.
12. To study the system used for heating and cooling of food material.
13. To study the modes of heat transfer used in food processing industry.
14. To study the unit and dimensions used in food processing industry.
15. Study visit to industrial food processing laboratory.

### References:

1. 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.

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

|            |          |   |          |          |          |          |          |          |          |          |
|------------|----------|---|----------|----------|----------|----------|----------|----------|----------|----------|
| <b>CO4</b> | -        | - | -        | -        | -        | -        | -        | -        | <b>5</b> | -        |
| <b>CO5</b> | <b>2</b> | - | -        | <b>3</b> | <b>3</b> | -        | <b>5</b> | -        | -        | <b>2</b> |
| <b>CO6</b> | <b>2</b> | - | <b>1</b> | <b>5</b> | -        | <b>4</b> | -        | <b>4</b> | <b>5</b> | <b>2</b> |
| <b>CO7</b> | -        | - | <b>1</b> | -        | <b>3</b> | <b>4</b> | <b>5</b> | <b>2</b> | -        | -        |

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:** Students will have a thorough understanding of the basic principles of various unit operations and its applications in food processing.

**CO3:** The students will know the scientific principles in processing technology specific to the materials.

**CO5:** The students will learn about Newton law rheology

**CO6:** The students will study about concept of size reduction

**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 to identify, calculate, formulate and solve problems of engineering and mass & energy balance.

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

**CO1:** Students will have a thorough understanding of the basic principles of various unit operations and its applications in food processing.

**CO2:**The students will know to identify, calculate, formulate and solve problems of engineering and mass & energy balance.

**CO6:** The students will study about concept of size reduction

**CO7:** The students will know various types of mechanical handling

**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 in industry as well as in agriculture.**

**CO3:** The students will know the scientific principles in processing technology specific to the materials.

**CO5:** The students will learn about Newton law rheology

**CO6:** The students will study about concept of size reduction

**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 the basic principles of various unit operations and its applications in food processing.

**CO2:**The students will know to identify, calculate, formulate and solve problems of engineering and mass & energy balance.

**CO3:** The students will know the scientific principles in processing technology specific to the materials.

**CO5:** The students will learn about Newton law rheology

**CO7:** The students will know various types of mechanical handling

**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, effecti**

**CO1:** Students will have a thorough understanding of the basic principles of various unit operations and its applications in food processing.

**CO3:** The students will know the scientific principles in processing technology specific to the materials.

**CO6:** The students will study about concept of size reduction

**CO7:** The students will know various types of mechanical handling

**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 the basic principles of various unit operations and its applications in food processing.

**CO3:** The students will know the scientific principles in processing technology specific to the materials.

**CO5:** The students will learn about Newton law rheology

**CO6:** The students will study about concept of size reduction

**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 the basic principles of various unit operations and its applications in food processing.

**CO3:** The students will know the scientific principles in processing technology specific to the materials.

**CO6:** The students will study about concept of size reduction

**CO7:** The students will know various types of mechanical handling

**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 to operate food process techniques.

**CO6:** The students will study about concept of size reduction

**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 the basic principles of various unit operations and its applications in food processing.

**CO3:** The students will know the scientific principles in processing technology specific to the materials.

**CO5:** The students will learn about Newton law rheology

**CO6:** The students will study about concept of size reduction

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

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

**Programme Code** : FTR

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

*Semester* : *IV*

**Course Type** : Major Mandatory

**Course Code** : FTR-254-MJM

**Course Title** : Cereal and Pulses Technology

*No.of Credits* : *02*

**No.of Teaching Hours** 30

### Learning Objectives:

- To understand the composition of cereal and pulses
- To understand the processing of cereal and pulse based product.
- To learn about milling of cereal and pulses.
- To develop different types of breakfast cereals
- To study different products of snack
- To learn about extrusion technology.

### Course Outcomes:

- CO1:** Students will have a thorough understanding the composition of cereal and pulses  
**CO2:** The students will understand the processing of cereal and pulse based product.  
**CO3:** The students will know about milling of cereal and pulses.  
**CO4:** Students will develop different types of breakfast cereals  
**CO5:** The students will know about study different products of snack  
**CO6:** Students will know learn about extrusion technology  
**CO7:** Students will know role of different types of Ready-to-Eat products.

### Topics and Learning Points

- |  |    |
|--|----|
| 1. Morphological Characteristics of cereals. | 2P |
| 2. Physical properties of cereals.           | 1P |
| 3. To study the cooking quality of rice.     | 2P |
| 4. To study the dehulling of pulses          | 1P |
| 5. To study the process of flaking.          | 1P |

- |  |    |
|--|----|
| 6. To study the process of puffing.                            | 2P |
| 7. To study the parboiling of rice.                            | 2P |
| 8. To study the malting of cereals                             | 2P |
| 9. To study the cooking of dal                                 | 2P |
| 10. To study the spouting of pulses.                           | 2P |
| 11. To study the preparation of soymilk and tofu               | 2P |
| 12. Production of protein rich product.                        | 2P |
| 13. To study the preparation of extruded product i.e. noodles. | 2P |
| 14. To study the preparation of instant dhokla.                | 1P |
| 15. Visit to industry  | 2P |

### References:

1. Kent, Technology of Cereal, 5th Ed. Pergamon Press, 2003
2. Chakraborty., Post Harvest Technology of Cereals, Pulses and Oilseeds, revised ed., Oxford & IBH Publishing Co. Pvt Ltd, 1988
3. Marshall, Rice Science and Technology, Wadsworth Ed., Marcel Dekker, New York, 1994
4. Mathews, R.H. Ed. 1989. Legumes: Chemistry and Technology and Human Nutrition, Marcel Dekker, New York
5. Pomeranz, Y. Ed. 1978. Wheat: Chemistry and Technology. American Association Cereal chemist. St. Paul, Minnesota.
6. Pomeranz, Y. 1987. Modern Cereal Science and Technology, VCH, New York
7. Salunkhe, D.K., Kadam S.S. Ed. 1989. Handbook of World Food Legume: Chemistry, Processing and Utilization, CRC Press, Florida.
8. Salunkhe, D.K., Kadam S.S. and Austin, A. Ed. 1986. Quality of Wheat and Wheat Production Metropolitan Book Co. New Delhi

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

Justification for the mapping

**PO1:- Disciplinary Knowledge - Understand the basic concepts, fundamental principles and experimental findings and the scientific the ories related to food technology, food science and**

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

**CO1:**Students will have a thorough understanding of unit operations followed for raw form to an edible form of cereals and legumes

**CO2:** The students will know the importance of various methods to identify any disorder in fresh commodities.

**CO3:** Students will know about emerging technologies related toharvesting ofcereals, pulses and oil seeds

**CO5:**Students will learn different processed products of cereals, pulses and oil seeds

**CO6:** Students will know about extrusion and various extrudes products

**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 methods to identify any disorder in fresh commodities.

**CO3:** Students will know about emerging technologies related to harvesting of cereals, pulses and oil seeds

**CO5:** Students will learn different processed products of cereals, pulses and oil seeds

**CO6:** Students will know about extrusion and various extruded products

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**CO1:** Students will have a thorough understanding of unit operations followed for raw form to an edible form of cereals and legumes

**CO2:** The students will know the importance of various methods to identify any disorder in fresh commodities.

**CO5:** Students will learn different processed products of cereals, pulses and oil seeds

**CO7:** Students will know about importance of lipids, their extraction process and further processing

**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 in industry as well as in agriculture.**

**CO3:** Students will know about emerging technologies related to harvesting of cereals, pulses and oil seeds

**CO4:** Students will learn different milling processes and their working

**CO6:** To know about extrusion and various extruded products and their advantages.

**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 unit operations followed for raw form to an edible form of cereals and legumes

**CO2:** The students will know the importance of various methods to identify any disorder in fresh commodities.

**CO3:** Students will know about emerging technologies related to harvesting of cereals, pulses and oil seeds

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

**CO4:** Students will learn different milling processes and their working

**CO5:** Students will learn different processed products of cereals, pulses and oil seeds

**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 unit operations followed for raw form to an edible form of cereals and legumes

**CO4:** Students will learn different milling processes and their working

**CO5:** Students will learn different processed products of cereals, pulses and oil seeds

**CO1:** Students will have a thorough understanding of unit operations followed for raw form to an edible form of cereals and legumes

**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 unit operations followed for raw form to an edible form of cereals and legumes

**CO2:** The students will know the importance of various methods to identify any disorder in fresh commodities.

**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**

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

**CO1:**Students will have a thorough understanding of unit operations followed for raw form to an edible form of cereals and legumes

**CO2:** The students will know the importance of various methods to identify any disorder in fresh commodities.

**CO3:** Students will know about emerging technologies related to harvesting of cereals, pulses and oil seeds

**CO5:**Students will learn different processed products of cereals, pulses and oil seeds

**CO6:** Students will know about extrusion and various extrudes products

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

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

**Programme Code** : FTR

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

*Semester* : *IV*

**Course Type** : Minor (MN)

**Course Code** : FTR-261-MN

**Course Title** : Beverage Technology

*No. of Credits* : *02*

**No. of Teaching Hours** : 30

### **Learning Objectives:**

- To develop the skills for processing of different types of alcoholic and non-alcoholic beverages,
- To get knowledge of packaged drinking water manufacturing industry.



- To learn about water purification.
- To know about FSSAI specifications for beverages.
- To study the history & importance of beverages
- To know about different types of beverages found in Indian as well as international market.

### Course Outcomes:

**CO1:** Students will be able to know different types of beverages found in Indian as well as international market.

**CO2:** Students will have better ideas regarding alcoholic and non-alcoholic beverages with water industry.

**CO3:** Students will have thorough knowledge of processing techniques used in beverage industry.

**CO4:** Students will learn about the history of beverages

**CO5:** Students will learn about FSSAI specifications for beverages

**CO6:** Students will learn about quality of beverages.

**CO7:** Students will learn about history & importance of beverages

### Topics and Learning Points

#### Unit I:

**5 Periods**

1.1 History, importance of beverages and status of beverage industry

1.2 Types of Beverages, history of beverage industry

#### Unit-II: Processing of beverages

**10 Periods**

2.1 Juice based beverages processing, Synthetic, still, carbonated, low-calorie and dry beverages

2.2 Isotonic and sports drinks, dairy based, alcoholic beverages fruit beverages, speciality beverages

2.3 Tea, coffee, cocoa, spices, plant extracts

#### Unit-III: Quality of Beverages

**10 Periods**

3.1 FSSAI specifications for beverages, Ingredients, manufacturing and packaging processes and equipment for different beverages

3.2 Sweeteners, colorants, Acidulants, clouding and clarifying and flavouring agents for beverages, Carbon dioxide and carbonation, Quality tests and control in beverages;

3.3 Miscellaneous beverages Coconut water, sweet toddy, sugar cane juice, coconut milk, flavoured syrups

#### Unit-IV: Water treatment

**5 Periods**

4.1 Water treatment and quality of process water

4.2 water purification, packaged drinking water Processing

### References:

1. Fruit & Vegetable Preservation, Shrivastava
2. Food Science , Norman Potter
3. Food Facts & Principles, Shakuntala Maney

| CO/<br>PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 |
|-----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| CO1       | 2   | -   | -   | -   | 4   | -   | -   | 3   | 4   | 2    |
| CO2       | -   | -   | 2   | -   | -   | -   | -   | -   | 3   | -    |

|     |   |   |   |   |   |   |   |   |   |   |
|-----|---|---|---|---|---|---|---|---|---|---|
| CO3 | 3 | - | - | 2 | 2 | - | - | 1 | 2 | 3 |
| CO4 | 2 | 1 | 1 | - | 2 | 2 | 1 | - | - | 2 |
| CO5 | 2 | 2 | 1 | - | - | 2 | 5 | - | - | 2 |
| CO6 | - | 2 | - | 4 | - | - | 1 | - | 1 | - |
| CO7 | - | - | 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:** Students will be able to know different types of beverages found in Indian as well as international market and health benefits.

**CO3:** Students will have thorough knowledge of different types of cereal based snacks food items available in market and their preparation method.

**CO4:** Students will get brief knowledge of fruits and vegetables based snacks and how to prepare it.

**CO5:** Students will understand about the working of equipment in beverage industry and their cost and advantages.

**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.**

**CO4:** Students will get brief knowledge of fruits and vegetables based snacks and how to prepare it.

**CO5:** Students will understand about the working of equipment in beverage industry and their cost and advantages.

**CO6:** Students may get knowledge about the Quality tests and control in beverages

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

**CO2:** Students will have better ideas regarding alcoholic and non-alcoholic beverages with water industry.

**CO4:** Students will get brief knowledge of fruits and vegetables based snacks and how to prepare it.

**CO5:** Students will understand about the working of equipment in beverage industry and their cost and advantages.

**CO7:** Students will understand about the FSSAI specifications for beverages.

**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 in industry as well as in agriculture.**

**CO1:** Students will be able to know different types of beverages found in Indian as well as international market and health benefits.

**CO4:** Students will get brief knowledge of fruits and vegetables based snacks and how to prepare it.

**CO5:** Students will understand about the working of equipment in beverage industry and their cost and advantages.

**CO6:** Students may get knowledge about the Quality tests and control in beverages

**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 be able to know different types of beverages found in Indian as well as international market and health benefit's.

**CO3:** Students will have thorough knowledge of different types of cereal based snacks food items available in market and their preparation method.

**CO4:** Students will get brief knowledge of fruits and vegetables based snacks and how to prepare it.

**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, effecti**

**CO4:** Students will get brief knowledge of fruits and vegetables based snacks and how to prepare it.

**CO5:** Students will understand about the working of equipment in beverage industry and their cost and advantages.

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

**CO4:** Students will get brief knowledge of fruits and vegetables based snacks and how to prepare it.

**CO5:** Students will understand about the working of equipment in beverage industry and their cost and advantages.

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**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 be able to know different types of beverages found in Indian as well as international market and health benefit's.

**CO3:** Students will have thorough knowledge of different types of cereal based snacks food items available in market and their preparation method.

**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 be able to know different types of beverages found in Indian as well as international market and health benefit's.

**CO2:** Students will have better ideas regarding alcoholic and non-alcoholic beverages with water industry.

**CO3:** Students will have thorough knowledge of different types of cereal based snacks food items available in market and their preparation method.

**CO6:** Students may get knowledge about the Quality tests and control in beverages

**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**

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

**CO1:** Students will be able to know different types of beverages found in Indian as well as international market and health benefit's.

**CO3:** Students will have thorough knowledge of different types of cereal based snacks food items available in market and their preparation method.

**CO4:** Students will get brief knowledge of fruits and vegetables based snacks and how to prepare it.

**CO5:** Students will understand about the working of equipment in beverage industry and their cost and advantages.

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

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

**Programme Code** : FTR

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

*Semester* : *IV*

**Course Type** : Minor (MN)

**Course Code** : FTR-262-MN

**Course Title** : Beverage Technology

No. of Credits :02

**No. of Teaching Hours** : 30

### Learning Objectives:

- To develop the skills for processing of different types of alcoholic and non-alcoholic beverages,
- To get knowledge of packaged drinking water manufacturing industry.
- To learn about water purification.
- To know about FSSAI specifications for beverages.
- To study the history & importance of beverages
- To know about different types of beverages found in Indian as well as international market.

### Course Outcomes:

**CO1:** Students will be able to know different types of beverages found in Indian as well as international market.

**CO2:** Students will have better ideas regarding alcoholic and non-alcoholic beverages with water industry.

**CO3:** Students will have thorough knowledge of processing techniques used in beverage industry.

**CO4:** Students will learn about the history of beverages

**CO5:** Students will learn about FSSAI specifications for beverages

**CO6:** Students will learn about quality of beverages.

**CO7:** Students will learn about history & importance of beverages

### Topics and Learning Points

- |                                |    |
|--------------------------------|----|
| 1. Preparation of Fruit Juice  | 2P |
| 2. Preparation of Fruit RTS    | 2P |
| 3. Preparation of Fruit Squash | 2P |

|                                     |    |
|-------------------------------------|----|
| 4. Preparation of Fruit Syrup       | 2P |
| 5. Preparation of Fruit Cordial     | 3P |
| 6. Preparation of Fruit Nectar      | 2P |
| 7. Preparation of wine              | 3P |
| 8. Preparation of Milkshake         | 1P |
| 9. Preparation of Mojito            | 2P |
| 10. Preparation of Fruit based soda | 1P |
| 11. Preparation of Jal-jeera        | 2P |
| 12. Preparation of Smoothie         | 2P |
| 13. Preparation of Mock tail        | 2P |
| 14. Preparation of Beer             | 3P |
| 15. Preparation of ORS              | 2P |

### References:

1. Fruit & Vegetable Preservation, Shrivastava
2. Food Science , Norman Potter
3. Food Facts & Principles, Shakuntala Maney

| CO/<br>PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1       | 2   | -   | -   | -   | 4   | -   | -   | 3   | 4   | 2    | -    | -    |
| CO2       | -   | -   | 2   | -   | -   | -   | -   | -   | 3   | -    | -    | 2    |
| CO3       | 3   | -   | -   | 2   | 2   | -   | -   | 1   | 2   | 3    | -    | -    |
| CO4       | 2   | 1   | 1   | -   | 2   | 2   | 1   | -   | -   | 2    | 1    | 1    |
| CO5       | 2   | 2   | 1   | -   | -   | 2   | 5   | -   | -   | 2    | 2    | 1    |
| CO6       | -   | 2   | -   | 4   | -   | -   | 1   | -   | 1   | -    | 2    | -    |
| 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:** Students will be able to know different types of beverages found in Indian as well as international market and health benefits.

**CO3:** Students will have thorough knowledge of different types of cereal based snacks food items available in market and their preparation method.

**CO4:** Students will get brief knowledge of fruits and vegetables based snacks and how to prepare it.

**CO5:** Students will understand about the working of equipment in beverage industry and their cost and advantages.

**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.**

**CO4:** Students will get brief knowledge of fruits and vegetables based snacks and how to prepare it.

**CO5:** Students will understand about the working of equipment in beverage industry and their cost and advantages.

**CO6:** Students may get knowledge about the Quality tests and control in beverages

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

**CO2:** Students will have better ideas regarding alcoholic and non-alcoholic beverages with water industry.

**CO4:** Students will get brief knowledge of fruits and vegetables based snacks and how to prepare it.

**CO5:** Students will understand about the working of equipment in beverage industry and their cost and advantages.

**CO7:** Students will understand about the FSSAI specifications for beverages.

**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 industry as well as in agriculture.**

**CO1:** Students will be able to know different types of beverages found in Indian as well as international market and health benefits.

**CO4:** Students will get brief knowledge of fruits and vegetables based snacks and how to prepare it.

**CO5:** Students will understand about the working of equipment in beverage industry and their cost and advantages.

**CO6:** Students may get knowledge about the Quality tests and control in beverages

**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 be able to know different types of beverages found in Indian as well as international market and health benefits.

**CO3:** Students will have thorough knowledge of different types of cereal based snacks food items available in market and their preparation method.

**CO4:** Students will get brief knowledge of fruits and vegetables based snacks and how to prepare it.

**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, effecti**

**CO4:** Students will get brief knowledge of fruits and vegetables based snacks and how to prepare it.

**CO5:** Students will understand about the working of equipment in beverage industry and their cost and advantages.

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

**CO4:** Students will get brief knowledge of fruits and vegetables based snacks and how to prepare it.

**CO5:** Students will understand about the working of equipment in beverage industry and their cost and advantages.

**CO6:** Students may get knowledge about the Quality tests and control in beverages

**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 be able to know different types of beverages found in Indian as well as international market and health benefits.

**CO3:** Students will have thorough knowledge of different types of cereal based snacks food items available in market and their preparation method.

**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 be able to know different types of beverages found in Indian as well as international market and health benefit's.

**CO2:** Students will have better ideas regarding alcoholic and non-alcoholic beverages with water industry.

**CO3:** Students will have thorough knowledge of different types of cereal based snacks food items available in market and their preparation method.

**CO6:** Students may get knowledge about the Quality tests and control in beverages

**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**

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

**CO1:** Students will be able to know different types of beverages found in Indian as well as international market and health benefit's.

**CO3:** Students will have thorough knowledge of different types of cereal based snacks food items available in market and their preparation method.

**CO4:** Students will get brief knowledge of fruits and vegetables based snacks and how to prepare it.

**CO5:** Students will understand about the working of equipment in beverage industry and their cost and advantages.

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

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

**Programme Code** : FTR

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

*Semester* : *IV*

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

**Course Code** : FTR-266-OE

**Course Title** : Confectionary Technology

*No. of Credits* : *02*

**No. of Teaching Hours** : 30



### Learning Objectives:

- To know about role, chemistry, manufacturing of various ingredients and products in confectionery industry.
- To develop knowledge and skills in the preparation and storage of Confectionery items
- To develop the skills on development of popular confectioner present in Indian Market.
- To learn about the different types of confectionary products.
- To study the history of confectionary technology.
- To know about the working of different confectionery equipments in confectionery industry.

### Course Outcomes:

**CO1:** Students will have a thorough understanding on effect of blending and molding on final product of confectionery.

**CO2:** The students will know the various extruded confectionery product development.

**CO3:** Students will able to prepare different confectionery products.

**CO4:** The students may plan to start their confectionery unit.

**CO5:** Students will know about the working of different confectionery equipments in confectionery industry.

**CO6:** Students may learn about the process of sugar & chocolate based confectionary products.

**CO7:** Students will know about manufacturing of various techniques in confectionery industry.

### Topics and Learning Points

|   |    |
|---|----|
| 1. Preparation of high boiled sweets                          | 2P |
| 2. Preparation of chocolates                                  | 3P |
| 3. Preparation of Fondant                                     | 4P |
| 4. Preparation of groundnut chikki                            | 4P |
| 5. Preparation of milk chocolate                              | 4P |
| 6. Preparation of toffee                                      | 2P |
| 7. Preparation of jelly candy                                 | 4P |
| 8. Preparation of Marshmallow                                 | 4P |
| 9. Preparation of Taffy or chews                              | 3P |
| 10. Preparation of Mysure Pak                                 | 3P |
| 11. Preparation of Fudge                                      | 3P |
| 12. Preparation of Son Papdi                                  | 3P |
| 13. Preparation of Petha                                      | 4P |
| 14. Visit to Confectionary industry and Preparation of report | 3P |
| 15. Preparation of report                                     | 2P |

### References:

1. Matz S. A. (1996): Bakery technology & engg, 1<sup>st</sup>edition, Arya book depo New delhi.
2. Practical Baking Cooking, 1st edition, Queen street house, U.K.
3. Kamel B. S. and Stauffer C. E. (1993): Advances in baking technology, 1<sup>st</sup> edition, Blackie academic and professional.
4. Aylwaed F. (2001): Food Technology Processing and Quality control \, 1<sup>st</sup> edition, Agrobios (India)
5. Khetarpaul N, Grewal R. B. and Jood S. (2005): Bakery Science and Cereal Technology, 1st edition, Daya publishing house, Delhi.
6. Minife B.W. (1997): Chocolate, cocoa and confectionery science and technology, 3rd edition, CBS Publishers and Distributors, New Delhi.

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

Justification for the mapping

**PO1:- 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 have a thorough understanding on effect of blending and baking on final product of bakery.

**CO2:** Students will be able to prepare different bakery products with different equipments.

**CO4:** The students may learn about the quality test of flour and what will be the effect of the flour quality on food.

**CO6:** Students may learn about the process of sugar & chocolate based confectionary products and they can easily classify the sugar & chocolate based confectionary products.

**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:** Students will be able to prepare different bakery products with different equipments.

**CO3:** The students will be able to understand bakery and confectionery technology

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

**CO4:** The students may learn about the quality test of flour and what will be the effect of the flour quality on food.

**PO4-Industry Relevance and entrepreneurial abilities: The students will adopt knowledge and skills that are relevant to the current needs and required practices of the industry or sector, they are entering. Students focus on fostering entrepreneurial skills in industry as well as in agriculture.**

**CO3:** The students will be able to understand bakery and confectionery technology.

**CO5:** Students will know about the working of different bakery equipments in bakery industry.

**CO6:** Students may learn about the process of sugar & chocolate based confectionary products and they can easily classify the sugar & chocolate based confectionary products.

**CO7:** Students will know about manufacturing of various techniques in bakery and confectionery industry.

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

**CO3:** The students will be able to understand bakery and confectionery technology.

**CO7:** Students will know about manufacturing of various techniques in bakery and confectionery industry.

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

**CO2:** Students will be able to prepare different bakery products with different equipments.

**CO5:** Students will know about the working of different bakery equipments in bakery industry.

**CO6:** Students may learn about the process of sugar & chocolate based confectionary products and they can easily classify the sugar & chocolate based confectionary products.

**CO7:** Students will know about manufacturing of various techniques in bakery and confectionery industry.

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

**CO4:** The students may learn about the quality test of flour and what will be the effect of the flour quality on food.

**CO5:** Students will know about the working of different bakery equipments in bakery industry.

**CO6:** Students may learn about the process of sugar & chocolate based confectionary products and they can easily classify the sugar & chocolate based confectionary 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.**

**CO3:** The students will be able to understand bakery and confectionery technology.

**CO7:** Students will know about manufacturing of various techniques in bakery and confectionery industry.

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

**CO1:** Students will have a thorough understanding on effect of blending and baking on final product of bakery.

**CO6:** Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.

**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**

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

**CO1:** Students will have a thorough understanding on effect of blending and baking on final product of bakery.

**CO2:** Students will able to prepare different bakery products with different equipments.

**CO4:** The students may learn about the quality test of flour and what will be the effect of the flour quality on food.

**CO6:** Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.

## 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** : S.Y B.Voc.

*Semester* : *IV*

**Course Type** : Vocational Skill Course(VSC)

**Course Code** : FTR-271-VSC

**Course Title** : Confectionary Technology

*No .of Credits* : *02*

**No. of Teaching Hours** 30

### Learning Objectives:

- To know about role, chemistry, manufacturing of various ingredients and products in confectionery industry.
- To develop knowledge and skills in the preparation and storage of Confectionery items
- To develop the skills on development of popular confectioner present in Indian Market.
- To learn about the different types of confectionary products.
- To study the history of confectionary technology.
- To know about the working of different Confectionery equipments in Confectionery industry.

### Course Outcomes:

**CO1:** Students will have a thorough understanding on effect of blending and molding on final product of confectionery.

**CO2:** The students will know the various confectionery product development.

**CO3:** Students will able to prepare different confectionery products.

**CO4:** The students may plan to start their confectionery unit.

**CO5:** Students will know about the working of different confectionery equipments in confectionery industry.

**CO6:** Students may learn about the process of sugar & chocolate based confectionary products.

**CO7:** Students will know about manufacturing of various techniques in confectionery industry

### Topics and Learning Points

1. Preparation of high boiled sweets **2P**
2. Preparation of chocolates **3P**
3. Preparation of Fondant **4P**

- |   |    |
|---|----|
| 4. Preparation of groundnut chikki                            | 4P |
| 5. Preparation of milk chocolate                              | 4P |
| 6. Preparation of toffee                                      | 2P |
| 7. Preparation of jelly candy                                 | 4P |
| 8. Preparation of Marshmallow                                 | 4P |
| 9. Preparation of Taffy or chews                              | 3P |
| 10. Preparation of Mysure Pak                                 | 3P |
| 11. Preparation of Fudge                                      | 3P |
| 12. Preparation of Son Papdi                                  | 3P |
| 13. Preparation of Petha                                      | 4P |
| 14. Visit to Confectionary industry and Preparation of report | 3P |
| 15. Preparation of report                                     | 2P |

### References:

1. Matz S. A. (1996): Bakery technology & engg, 1<sup>st</sup>edition, Arya book depo New delhi.
2. Practical Baking Cooking, 1st edition, Queen street house, U.K.
3. Kamel B. S. and Stauffer C. E. (1993): Advances in baking technology, 1<sup>st</sup> edition, Blackie academic and professional.
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6. Minife B.W. (1997): Chocolate, cocoa and confectionery science and technology, 3rd edition, CBS Publishers and Distributors, New Delhi.

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

Justification for the mapping

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

**CO1:** Students will have a thorough understanding on effect of blending and baking on final product of bakery.

**CO2:** Students will able to prepare different bakery products with different equipments.

**CO4:** The students may learn about the quality test of flour and what will be the effect of the flour quality on food.

**CO6:** Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.

**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:** Students will able to prepare different bakery products with different equipments.

**CO3:** The students will be able to understand bakery and confectionery technology

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

**CO4:** The students may learn about the quality test of flour and what will be the effect of the flour quality on food.

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**CO3:** The students will be able to understand bakery and confectionery technology.

**CO5:** Students will know about the working of different bakery equipments in bakery industry.

**CO6:** Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.

**CO7:** Students will know about manufacturing of various techniques in bakery and confectionery industry.

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

**CO3:** The students will be able to understand bakery and confectionery technology.

**CO7:** Students will know about manufacturing of various techniques in bakery and confectionery industry.

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

**CO2:** Students will able to prepare different bakery products with different equipments.

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**CO7:** Students will know about manufacturing of various techniques in bakery and confectionery industry.

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

**CO4:** The students may learn about the quality test of flour and what will be the effect of the flour quality on food.

**CO5:** Students will know about the working of different bakery equipments in bakery industry.

**CO6:** Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary 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.**

**CO3:** The students will be able to understand bakery and confectionery technology.

**CO7:** Students will know about manufacturing of various techniques in bakery and confectionery industry.

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

**CO1:** Students will have a thorough understanding on effect of blending and baking on final product of bakery.

**CO6:** Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.

**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**

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

**CO1:** Students will have a thorough understanding on effect of blending and baking on final product of bakery.

**CO2:** Students will be able to prepare different bakery products with different equipments.

**CO4:** The students may learn about the quality test of flour and what will be the effect of the flour quality on food.

**CO6:** Students may learn about the process of sugar & chocolate based confectionary products and they can easily classified the sugar & chocolate based confectionary products.



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

*Semester* IV

**Course Type** : Ability Enhancement Course (AEC)

**Course Code** : FTR-281-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 Technology & Research  
(2023 Pattern)**

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

**Programme Code** : FTR

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

*Semester* IV

**Course Type** : Community Engagement Programme (CEP)

**Course Code** :FTR-295-CEP

**Course Title** : Community Engagement Programme (CEP)

*No. of Credits* :02

**No. of Teaching Hours** 30