**Anekant Education Society's**

# Tuljaram Chaturchand College, Baramati.

***(Autonomous)***

**Three Year B. Voc. Degree Programme in Dairy Technology**

**(Faculty of Vocational Courses)**

## CBCS Syllabus

## S. Y. B. Voc. Dairy Technology

## Semester -III

## For Department of

## Dairy Technology

## 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: S. Y. B. Voc.(Dairy Technology)

## Preamble

AES's Tuljaram Chaturchand College has made the decision to change the syllabus 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 multi disciplinary 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 Dairy sector and related subjects, the Board of Studies in Dairy Technology at Tuljaram Chaturchand College, Baramati - Pune, has developed the curriculum for the first semester of F. Y. B. Voc. Dairy 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$^{st}$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 EducationPolicy(NEP)2020,LOCF(UGC),NCrF,NHEQF,Prof.R.D.Kulkarni'sReport,Government of Maharashtra's General Resolution dated 20$^{th}$April and 16th May 2023, and the Circular issued by SPPU, Pune on 31st May2023.

The department of Dairy technology aims at imparting quality education in the realm of procurement, processing and packaging of milk and milk products with an objective to enhance and expand the knowledge and skill set of target students so that they can contribute in the betterment of society at large. The department of Dairy Technology was established with the objective of producing highly proficient technocrats who can meet the standards of the corporate. The department purports to have dexterous mentors adept at molding the student talent pool. A team of well qualified faculty navigates issuing priceless guidance and tapping the potential of students.

It is estimated that a huge number of Dairy Technology professionals will be required in India five years down the line in keeping with the global trend. Indian professionals are respected across the world for their technology – related skills. Our focus in this department is not only on completing the curriculum to pass the examinations but we also try to keep up with the developments in the technology and expose the students to the latest to ensure that they are able to cope up with the fast changing industrial scenario.

The department is in purpose – built accommodation and is equipped with teaching and office space as well as well equipped laboratories for practical - based teaching. All faculties of the department are members of various professional societies and technical bodies like AFST (I), etc. the department has signed MoU's with various organizations for student exchange and projects.

Overall, revising the Dairy Technology syllabus 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)

***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)in Dairy Technology

**From 2022 - 2023 to 2024 - 2025**

| Sr.No. | Name | Designation |
|---|---|---|
| 1. | **Ms. Patwardhan Shubhada S.** | Chairman |
| 2. | **Ms. More Nikita Baban** | Member |
| 3. | **Ms. Khomane Vaishnavi B.** | Member |
| 4. | **Ms. Pranoti Anagal** | Expert from University |
| 5. | **Dr. Khojare Ajit S.** | Expert from other University |
| 6. | **Dr. Sahoo A. K.** | Expert from other University |
| 7. | **Mr. Chavan Ganesh** | Industry Expert |
| 8. | **Mr. Vhorkate Karan Dayaram** | Meritorious Alumni |
| 9. | **Ms. Taware Shravani Rajesh** | Student Representative |
| 10. | **Mr. Gavali Saurabh Anil** | Student Representative |

# Credit Distribution Structure for S. Y. B. Voc. – 2024 – 2025 (Dairy Technology)

| Level | Semester | Major | | Minor | OE | VSC,SEC, (VSEC) | AEC,VEC,IKS | OJT, FP,CEP, CC,RP | Cum. Cr/Sem | Degree/Cum.Cr. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Mandatory | Electives | | | | | | | |
| | | | | | | | | | | |
| 4.5 | III | DRT-201-MJM: Dairy Processing Equipment (2credits) | -- | DRT-211-MN Dairy Chemistry (2credits) | DRT – 216 - OE: Entrepreneurship Development (2credits) | DRT – 221 - VSC: Entrepreneurship Development (2credits) | MAR-231-AEC भाषिक उपयोजन व लेखण कौशल्ये<br>HIN – 231 - AEC हिंदी भाषा कौशल्ये<br>SAN-231-AEC प्राथमिक संभाषण कौशल्यम्<br>(2credit) | DRT-235-FP (2credit) | 24 | UG Certificate 44credits |
| | | DRT -202-MJM Fermented Milk Products (2credits) | | | | | GEN-245-IKS Indian Knowledge System (Generic) (2credit) | | | |
| | | DRT -203-MJM: Manufacture of Fermented Milk Products (2credits) | | DRT-212-MN Chemical Analysis of Milk (2credits) | | | | NSS-239-CC NCC-239-CC PES-239-CC YOG-239-CC CUL-239-CC (2credit) | | |
| | | DRT-204-MJM: | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Nutrition Science (2credits) | | | | | | | |
| IV | DRT-251-MJM: Dairy Engineering (2 credits)<br>DRT-252-MJM: Traditional Indian Dairy Products (2 credits)<br>DRT-253-MJM: Manufacture of Traditional Indian Dairy Products (2 credits)<br>DRT-254-MJM: Food Preservation Technology (2 credits) | -- | DRT-261-MN: Dairy Microbiology (2credits)<br>DRT-262-MN: Microbial Analysis of Milk (2credits) | DRT -266-OE: Food Safety, Hygiene and Sanitation (2credits) | DRT-276-SEC Research Methodology (2credits) | MAR-281-AEC लेखण निर्मिती व परिक्षण कौशल्ये<br>HIN – 281 - AEC हिंदी भाषा: संप्रेषण कौशल्ये<br>SAN-281-AEC प्रगत संभाषण कौशल्यम्<br>(2credit) | NSS-289-CC<br>NCC-289-CC<br>PES-289-CC<br>YOG-289-CC<br>CUL-289-CC<br>(2credit)<br>DRT-285-CEP (2credit) | 22 |
| Cum Cr. | **16** | -- | 8 | 4 | 4 | 6 | 8 | 46 |

# Course Structure for S. Y. B. Voc. Dairy Technology (2023 Pattern)

| Sem | Course Type | Course Code | Course Name | Theory /Practical | Credits |
|---|---|---|---|---|---|
| III | Major Mandatory | DRT-201-MJM | Dairy Processing Equipment | Theory | 02 |
| | Major Mandatory | DRT-202-MJM | Fermented Milk Products | Theory | 02 |
| | Major Mandatory | DRT-203-MJM | Fermented Milk Products | Practical | 02 |
| | Major Mandatory | DRT-204-MJM | Nutrition Science | Practical | 02 |
| | Minor | DRT-211-MN | Dairy Chemistry | Theory | 02 |
| | Minor | DRT-212-MN | Chemical Analysis of Milk | Practical | 02 |
| | Open Elective(OE) | DRT- 216-OE | Dairy Plant Management | Theory | 02 |
| | Vocational Skill Course(VSC) | DRT-221-VSC | Entrepreneurship Development | Practical | 02 |
| | Ability Enhancement Course(AEC) | MAR-231-AEC | MAR- भाषिक उपयोजन व लेखण कौशल्ये | Theory | 02 |
| | | HIN-231-AEC | HIN- हिंदी भाषा कौशल्ये | | |
| | | SAN-231-AEC | SAN- प्राथमिक संभाषण कौशल्यम् | | |
| | Co-curricular Course(CC) | YOG/PES/CUL /NCC-239-CC | NSS-239-CC | Practical | 02 |
| | | | NCC-239-CC | | |
| | | | PES-239-CC | | |
| | | | YOG-239-CC | | |
| | | | CUL-239-CC | | |
| | Field Project (FP) | DRT-235- FP | Field Project | Practical | 02 |
| | Indian Knowledge System(IKS) | GEN-245-IKS | Indian Knowledge System (Generic) | Theory | 02 |
| | | | | **Total Credits Semester-III** | **24** |
| IV | Major Mandatory | DRT-251-MJM | Dairy Engineering | Theory | 02 |
| | Major Mandatory | DRT-252-MJM | Traditional Indian Dairy Products | Theory | 02 |
| | Major Mandatory | DRT-253-MJM | Manufacture of Traditional Indian Dairy Products | Practical | 02 |
| | Major Mandatory | DRT-254-MJM | Food Preservation Technology | Practical | 02 |
| | Minor | DRT-261-MN | Dairy Microbiology | Theory | 02 |
| | Minor | DRT-262-MN | Microbial Analysis of Milk | Practical | 02 |
| | Open Elective(OE) | DRT- 266-OE | Food Safety, Hygiene and Sanitation | Theory | 02 |
| | Skill Enhancement Course(SEC) | DRT-276-SEC | Research Methodology | Theory | 02 |

| | | | | | |
|---|---|---|---|---|---|
| | Ability Enhancement Course(AEC) | MAR-281-AEC | MAR- लेखण निर्मिती व परिक्षण कौशल्ये | Theory | 02 |
| | | HIN-281-AEC | HIN- हिंदी भाषा: संप्रेषण कौशल्ये | | |
| | | SAN-281-AEC | SAN- प्रगत संभाषण कौशल्यम् | | |
| | Co-curricular Course(CC) | YOG/PES/CUL /NCC-289-CC | NSS-289-CC | Practical | 02 |
| | | | NCC-289-CC | | |
| | | | PES-238-CC | | |
| | | | YOG-289-CC | | |
| | | | CUL-289-CC | | |
| | Community Engagement Project (CEP) | DRT-285- CEP | | Practical | 02 |
| | **Total Credits Semester IV** | | | | 22 |
| | **Cumulative Credits Semester III and IV** | | | | **46** |

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

**Name of the Programme** : B. Voc. Dairy Technology

**Programme Code** : DRT

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

**Semester** : III

**Course Type** : Major Mandatory

**Course Code** : DRT-201-MJM

**Course Title** : Dairy Processing Equipment (Th)

**No. of Credits** : 02

**No. of Teaching Hours** : 30

## Course Objectives:

1. To understand type of materials used for making of an equipment in dairy industry.
2. To know about operations of equipment in a dairy industry.
3. To identify and define working of a dairy equipment.
4. To know about maintenance of Equipment.
5. To understand the design and working of pumps, and other processing Equipment.
6. To know about how to assemble different parts of equipments.
7. To achieve technical knowledge in operating and maintaining different equipments.

## Course Outcomes:

**By the end of the course, students will be able to:**

**CO1.** Students will get exposure to various equipments used for milk processing.
**CO2.**They will achieve the knowledge about different pipes and pumps used in the industry.
**CO3.**They will be able to assemble different parts of equipments.
**CO4.**They will be able to understand the working principle of machinery which is used in dairy industry.
**CO5.**They will be able to operate the equipments & maintenance of equipments with technical knowledge.
**CO6.**They will understand design and working of processing equipments.
**CO7.**They will able to identify different types processing equipments.

## Topics and Learning Points

**Unit-1** Materials and sanitary features of the dairy & food equipment, Sanitary pipes and fittings, Pumps: Types, working principle, care & maintenance, Cleaning & Sanitation in Dairy & Food equipment: Cleaning & Sanitizing Agents, Cleaning in Place (CIP)
Description, working and maintenance of milk reception equipment: Tipping tank, Storage tank, Can washer **08 Periods**

**Unit-2** Study of Filter and Clarifier, Bactofugation equipment, Centrifugal Cream Separator, Tri-
Process machine **07 Periods**

**Unit-3** Homogenizer: Theory of homogenization, Single & amp' Two stage homogenizer, Design of homogenizing valve, Efficiency of homogenization. **07 Periods**

**Unit-4** Pasteurization: Formulation standards for pasteurization, regeneration and efficiency of Pasteurization, Sterilization: Batch, Continuous, UHT, Aseptic packaging, Pouch & Bottle filling machine, Carbonation unit. FSSAI categories for dairy equipments **08 Periods**

**References:**


- Dairy engineering Technology and engineering of Dairy Plant Operation- Anantkrishnan C.P. Simha N.N. (1987)
- Dairy Plant Engineering and Management (1990) Tufail Ahmad
- Food engineering and Dairy Technology- Kessler H.G. (1981)

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

**Name of the Programme** : B. Voc. Dairy Technology

**Programme Code** : DRT

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

**Semester** : III

**Course Type** : Major Mandatory

**Course Code** : DRT-202-MJM

**Course Title** : Fermented Milk Products (Th)

**No. of Credits** : 02

**No. of Teaching Hours** : 30

## Course Objectives:

1. To learn basics of Fermentations, Starter cultures, and Fermentor
2. To understand the function of a starter culture
3. To know the advantages and importance of fermentation
4. To learn making process of various western fermented milk products
5. To learn making process of various Indian fermented milk products
6. To learn about nutritional values of fermented products.
7. To learn Principles of cheese making.

## Course Outcomes:

**By the end of the course, students will be able to:**

**CO1.**Students will get an exposure towards fermented class of milk products.
**CO2.**They will know the importance of fermented milk products.
**CO3.**They will acquire information on fermentation process and products.
**CO4.**They will be able to understand processing of cheese along with some other fermented products.
**CO5.**They will be able to understand the function of microorganisms in Dairy products.
**CO6.**They will learn principle of cheese making.
**CO7.**They will able to understand basics of fermentation, starter culture and fermentors.

## Topics and Learning Points

**Unit-1- Introduction to fermentation and starter culture**

Definition,Types of fermentation, Design and working of Fermentor, Characteristics of fermented milk products, Nutritional importance, need, and benefits of fermented milk products. Definition and classification of Starter culture, Types and importance, Role and function of starter culture, properties of good starter. Defects in starter culture **08 Periods**

**Unit 2- Indian Fermented Milk Products**

Varieties of Indian fermented milk products: Dahi, Mishti Dahi, Buttermilk, Lassi, Chakka, Shrikhand, Shrikhand wadi **07 Periods**

**Unit 3- Western Fermented Milk Products**

Varieties of western fermented milk products: Yoghurt, Kefir, Kumis, Bulgarian butter milk, Acidophilus milk, Yakult and leben. **07 Periods**

**Unit 4-Cheese**

History Definition and classification of cheeses, Microbiology of cheese making, Chemistry of cheese making. Principle and method of manufacture of cheddar cheese, Mozzarella cheese, Gauda cheese and processed cheese**.** **08 Periods**

**References:**


1. Outlines of Dairy Technology, (1980) Sukumar De
2. Cultured milk products in CRC handbook (1982) Chandan R.C, Shahani K.K.
3. Yogurt Science and Technology (2004) Tamime A.Y. and Robinson R.K.

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

**Name of the Programme** : B. Voc. Dairy Technology

**Programme Code** : DRT

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

**Semester** : III

**Course Type** : Major Mandatory

**Course Code** : DRT-203-MJM

**Course Title** : Manufacture of Fermented Milk Products (Pr)

**No. of Credits** : 02

**No. of Teaching Hours** : 60

## Course Objectives:

1. To learn basics of manufacture of fermented milk products.
2. To understand process flow of the manufacture of fermented milk products.
3. To know the advantages and importance of fermentation
4. To learn the storage requirements of fermented milk products
5. To learn the manufacture and varieties of Cheese.
6. To learn making process of different fermented milk products.
7. To understand about fermentor

## Course Outcomes:

**By the end of the course, students will be able to:**

**CO1.**Students will get an exposure towards fermented class of milk products.
**CO2.**They will know the importance of fermented milk products.
**CO3.**They will acquire information on fermentation process and products.
**CO4.**They will be able to understand processing of cheese along with some other fermented products.
**CO5.**They will learn principle of cheese making.
**CO6.**They will able to understand basics of fermentation, starter culture and fermentors.
**CO7.**They will understand need and importance of fermented products

## Topics and Learning Points

1. Preparation of Dahi (I) 4P
2. Preparation of Dahi (II) 4P
3. Preparation of Mishti Dahi(I) 4P
4. Preparation of Mishti Dahi(II) 4P
5. Preparation of Lassi 4P
6. Preparation of Shrikhand(I) 4P

7. Preparation of Shrikhand(II) 4P
8. Preparation of Yogurt 4P
9. Preparation of Cheddar cheese (I) 4P
10. Preparation of Cheddar cheese (II) 4P
11. Preparation of Mozerella Cheese(I) 4P
12. Preparation of Mozerella Cheese(II) 4P
13. Preparation of Processed cheese(I) 4P
14. Preparation of Processed cheese(II) 4P
15. Preparation of Processed cheese spread 4P

**References:**


1. Outlines of Dairy Technology, (1980) Sukumar De
2. Cultured milk products in CRC handbook (1982) Chandan R.C, Shahani K.K

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

**Name of the Programme** : B. Voc. Dairy Technology

**Programme Code** : DRT

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

**Semester** : III

**Course Type** : Major Mandatory

**Course Code** : DRT-204-MJM

**Course Title** : Nutrition Science (Pr)

**No. of Credits** : 02

**No. of Teaching Hours** : 60

## Course Objectives:

1. To understand the sources of different nutrients.
2. To understand foods belonging to different food groups.
3. To know the serving size of each food group.
4. To calculate calorie and protein intake.
5. To evaluate owns dietary intake
6. To understand making process of different nutrient rich products.
7. To learn about the importance of vitamins and minerals

## Course Outcomes:

**By the end of the course, students will be able to:**

**CO1.**Students will understand the nutritional make-up of milk.
**CO2.**They will get the knowledge about all the nutrients.
**CO3.**They will have an elaborate idea of all the nutrients present in the milk.
**CO4.**They will understand the function of nutrients in the production of milk products.
**CO5.**They will acquire the knowledge on effect of nutrients on human body.
**CO6.**They will be able to evaluate their own diet and weight status.
**CO7.** They will able to understand diet planning of adult male and female.

## Topics and Learning Points

| | | |
|---|---|---|
| 1) | Identification of food sources for various nutrients | 04P |
| 2) | Introduction to diet planning using food exchange list | 04P |
| 3) | Diet Planning of adult male | 04P |
| 4) | Diet Planning of adult female | 04P |
| 5) | Assessment of weight and height of self and calculation of BMI | 04P |
| 6) | Planning of Protein and Energy rich Product. | 04P |
| 7) | Planning of Vitamin A rich Product. | 04P |
| 8) | Planning of Vitamin B1 rich Product. | 04P |
| 9) | Planning of Vitamin B2 rich Product. | 04P |

| | |
|---|---|
| 10) Planning of Vitamin B3 rich Product. | 04P |
| 11) Planning of Vitamin C rich Product. | 04P |
| 12) Planning of Calcium rich Product. | 04P |
| 13) Planning of Iron rich Product. | 04P |
| 14) Record diet of self-using 24 hour dietary recall. | 04P |
| 15) Evaluation of own diet and weight status. | 04P |

**References:**


1. Bamji MS, Krishnaswamy K, Brahmam GNV (2009). *Textbook of Human Nutrition*, 3rd edition. Oxford and IBH Publishing Co. Pvt. Ltd.
2. Srilakshmi (2007). *Food Science*, 4th Edition. New Age International Ltd. 29
3. Wardlaw MG, Paul M Insel Mosby (1996). Perspectives in Nutrition, Third Edition.
4. B. Srilakshmi (2007) Dietetics, Revised Fifth Edition, New Age International Publishers
5. B. Srilakshmi (2011) Nutrition Science, Third Edition, New Age International Publishers
6. Dr. M. Swaminathan (2006) Advanced Text book on Food and Nutrition, Volume 1 and 2, Second Edition, BAPPCO Publication.
7. Jim Mann and A. Stewart Truswell (2010) Essentials of Human Nutrition, Third Edition, Oxford Publication.
8. Michael J. Gibney, Hester H. Vorster and Frans J. Kok (2002) Introduction to Human Nutrition, First Indian Reprint, Blackwell Publishing.
9. Biochemistry of Foods-N.A.M Eskin, H.M. Henderson, R.J. Townsend.
10. Introduction to Biochemistry of Foods, Z. Berk

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

**Name of the Programme** : B. Voc. Dairy Technology

**Programme Code** : DRT

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

**Semester** : III

**Course Type** : Minor

**Course Code** : DRT-211-MN

**Course Title** : Dairy Chemistry (Th)

**No. of Credits** : 02

**No. of Teaching Hours** : 30

## Course Objectives:

1. To understand the chemistry of milk and its products.
2. To understand preservatives and processing of milk.
3. To study the adulteration in milk and milk products.
4. To learn basic analysis methods used in dairy industry.
5. To understand about the composition of milk and milk products.
6. To understand about the role of each component in milk and their interactions.
7. To understand physical and chemical properties of milk and milk products.

## Course Outcomes:

**By the end of the course, students will be able to:**

**CO1.** Students will understand the chemical make-up of milk.
**CO2.**They will understand the different aspects of clean milk production,
**CO3.**They will be able to asses composition of milk.
**CO4.**They will acquaint with the properties of milk.
**CO5.**They can explain the crucial parameters of the milk.
**CO6.**They will able to understand physio- chemical properties of colostrums
**CO7.**They will bale to understand correlation of different components of milk.

## Topics and Learning Points

**Unit-1:Introduction to dairy chemistry and Vitamins and Minerals :** Definition and structure of milk, factors affecting composition of milk, Physico-chemical properties of milk Nutritive value of milk, colostrum, Coagulation of Milk with Heat, acid, enzymes and alcohol. Unsaponifiable matter and fat soluble vitamins, Milk Salts: Mineral in milk (a) major mineral (b) Trace elements, physical equilibria among the milk salts and Milk contact surfaces and metallic contamination.

**08 Periods**

**Unit-2:Proteins:** Nomenclature and classification of milk proteins, casein, α-Lactalbumin and β lactoglobulin, Immmunoglobulin and other minor milk proteins and non-proteins nitrogen constituents of milk, Hydrolysis and denaturation of milk proteins under different physical and chemical environments, Milk enzymes with special reference to lipases, Xanthine Oxidase, phosphates, proteases and lactoperoxidase.

**08 Periods**

**Unit-3:Carbohydrates:** Carbohydrates and its classification, Milk carbohydrates their status and importance. Physical and chemical properties of lactose, processing related degradation of lactose **07 Periods**

**Unit-4:Lipds:** Definition, general composition and classification of milk lipids. Nomenclature and general structure of glycerides, Structure of FG, Chemistry of FGM, factors affecting the fatty acid composition. Milk phospholipids and their role in milk products, Rancidity and its control

**07 Periods**

## References:


- Principles of dairy chemistry (1959) Jenness R and Patton S. John Wiley's, USA
- Fundamentals of Dairy chemistry, (1979) Webb B.H.
- Test book of Dairy Chemistry (1999) ICAR

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

**Name of the Programme** : B. Voc. Dairy Technology

**Programme Code** : DRT

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

**Semester** : III

**Course Type** : Minor

**Course Code** : DRT-212-MN

**Course Title** : Chemical Analysis of Milk (Pr)

**No. of Credits** : 02

**No. of Teaching Hours** : 60

## Course Objectives:

1. To understand the chemistry of milk and its products.
2. To understand preservatives and processing of milk.
3. To study the adulteration in milk and milk products.
4. To learn basic analysis methods used in dairy industry.
5. To understand about the composition of milk and milk products.
6. To understand about the role of each component in milk and their interactions.
7. To understand physical and chemical properties of milk and milk products.

## Course Outcomes:

**By the end of the course, students will be able to:**

**CO1.** Students will get vast knowledge of chemicals used for milk analysis.
**CO2.**They will understand standard values of quality parameters.
**CO3.**They will be able to examine the quality of the milk.
**CO4.**They will get exposure to the instruments of analysis.
**CO5.**They will understand the functions of all the chemicals used for the analysis.
**CO6.**They will able to perform different platform test for milk.
**CO7.**They will be able to prepare chemicals of different normality used for milk analysis.

## Topics and Learning Points

| | | |
|---|---|---|
| 1. | Preparation of Standard 0.1N Sodium Hydroxide Solution | 4P |
| 2. | Preparation of Standard 0.1N Hydrochloric Acid | 4P |
| 3. | Preparation of Gerber Acid for Determination of Fat in Milk | 4P |
| 4. | Sampling of Milk | 4P |
| 5. | Platform Test - (I) Colt – On – Boiling Test | 4P |
| 6. | Platform Test – (Ii) Alcohol Test | 4P |
| 7. | Platform Test – (Iii) Sediment Test | 4P |
| 8. | Determination of Fat in Milk by Gerber Method | 4P |
| 9. | Determination of Solid – not – Fat (SNF) in Milk | 4P |

| | |
|---|---|
| 10. Determination of Total Solid (TS) in Milk | 4P |
| 11. Specific Gravity of Milk | 4P |
| 12. Determination of Titrable Acidity of Milk | 4P |
| 13. Determination of pH of Milk | 4P |
| 14. Resazurin Reduction Test | 4P |
| 15. Methylene Blue Reduction (MBR) Test | 4P |

**References:**


- Principles of dairy chemistry (1959) Jenness R and Patton S. John Wiley's, USA
- Fundamentals of Dairy chemistry, (1979) Webb B.H.
- Test book of Dairy Chemistry (1999) ICAR

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

**Name of the Programme** : F. Y. B Voc. Dairy Technology

**Programme Code** : DRT

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

**Semester** : III

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

**Course Code** : DRT-216-OE

**Course Title** : Dairy Plant Management (Th)

**No. of Credits** : 02

**No. of Teaching Hours** : 30

## Course Objectives:

1. To learn basics of management
2. To learn key skills in managing the efficiency and man power of the dairy plant.
3. To learn the principles of dairy plant management
4. To understand Human Resource Management
5. To learn about location requirement for dairy pant
6. To learn efficiency of plant operation
7. To understand the layout of dairy plant

## Course Outcomes:

**By the end of the course, students will be able to:**

**CO1.** Students will learn key skills in managing efficiency and man power of dairy plant
**CO2.**They will learn principles of dairy plant management.
**CO3.**They will understand the plant operation, dairy plant design and layout in details
**CO4.**They will learn about human resource management.
**CO5.**They will learn about energy conservation and auditing.
**CO6.**They will learn about the financial and managerial efficiency provision for industrial legislation in India.
**CO7.**They will learn about selection of location, site, space requirement for dairy plant.

## Topics and Learning Points

**Unit 1- Production management and Efficiency of Plant Operation:** Introduction, definition, Function and structure of production management, Production planning and control . Introduction, definition, Product accounting, Setting up norms for operational and processing losses for quantity of fat and SNF, Monitoring efficiency **08 Periods**

**Unit 2- Plant Operations:** Energy conservation and auditing, Product and process control, Control charts, Process Sigma, Efficiency factors losses, financial and managerial efficiency, Provision for industrial legislation in India particularly in dairy industry.

**07 Periods**

**Unit 3- Human Resource Management:** Personnel management, Manpower Planning, Recruitment, training, transfer, promotion policies, job specifications, job evaluation, Job enhancement, Job enrichment, MBO, working conditions **08 Periods**

**Unit 4- Dairy Plant Design and Layout:** Introduction, Types of dairies, Location of the plant, selection of site, Hygiene design considerations, Space requirement, Single and multilevel design, layout of process section, foundations, walls, windows and doors.

**07 Periods**

**References:**


- Dairy Plant Management- D.B. Puranik
- Management of dairy plants- Martin Mortensen (2012)
- In milk plant layout FAO- H.S. Hall, B. Helge (1963)
- Competitive global management Principles and Strategies , Abbas F, Alkhafaji (1995)

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

**Name of the Programme** : F. Y. B Voc. Dairy Technology

**Programme Code** : DRT

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

**Semester** : II

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

**Course Code** : DRT-221-VSC

**Course Title** : Entrepreneurship Development (Pr)

**No. of Credits** : 02

**No. of Teaching Hours** : 60

## Course Objectives:

1. To understand the concept of entrepreneurship.
2. To learn key skills for being a successful entrepreneur.
3. To understand the basics for their start-ups.
4. To understand the laws and regulations for the industries.
5. To know about the institutes working for entrepreneurial support.
6. To understand the market survey and opportunities.
7. To learn about making of project reports.

## Course Outcomes:

**By the end of the course, students will be able to:**

**CO1.**Students will get some basic guidance for their start-up.
**CO2.**They will be aware of all the institutes working for entrepreneurial support.
**CO3.**They will be able to structure their project reports.
**CO4.**They will understand the qualities and traits needed for entrepreneurship.
**CO5.**They will be educated towards laws and regulations for the industries.
**CO6.**They will understand concept of entrepreneurship.
**CO7.**They will learn skills for being a successful entrepreneur.

## Topics and Learning Points

1. Study of concept of entrepreneurship 4P
2. Study of need entrepreneurship development 4P
3. Study of quality of entrepreneurs, rewards and penalties for entrepreneur 4P
4. Study of sources of information , application forms 4P
5. Study district industry center (DIC's) 4P
6. Study of role of commercial bank for financial assistance 4P
7. Study of project report preparation 4P

8. Study of business planning 4P
9. Study of personal quality as an entrepreneur 4P
10. Study of procedure for starting small scale industry 4P
11. Study of identification of business opportunities and process of final product selection 4P
12. Study of principal of taxation 4P
13. Study of factory act 1948 4P
14. Study of environmental consideration 4P
15. Study of safety at work place and personal protection equipment 4P

**References:**


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