



**Anekant Education Society's  
Tuljaram Chaturchand College, Baramati.  
(Empowered Autonomous)**

**Three Year B. Voc. Degree Programme in Dairy Technology  
(Faculty of Vocational Courses)**

**CBCS Syllabus**

**F. Y. B. Voc. Dairy Technology Semester -II**

**For Department of  
Dairy Technology  
Tuljaram Chaturchand College, Baramati**

**Choice Based Credit System Syllabus (2025 Pattern)**

**(As Per NEP 2020)**

**To be implemented from Academic Year 2025-2026**

### **Title of the Programme: F. 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. As per recommendation of steering committee meeting held on 22<sup>nd</sup> and 23<sup>rd</sup> April 2025, they have suggested separate guideline for Vocational Program. This syllabus is according to the same guideline. The NEP envisions making education more holistic and effective and to lay emphasis on the integration of general (academic) education, vocational education and experiential learning. The NEP introduces holistic and 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<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 16th May 2023, and the Circular issued by SPPU, Pune on 31st May 2023.

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)*****PSO1: Technical Competence***

Students will acquire specialized technical knowledge and practical skills in dairy processing, milk product manufacturing, quality assurance, and plant operations, enabling them to work efficiently in dairy and allied industries.

***PO2 Problem Solving Skills:***

Students will develop analytical and critical thinking skills to identify, assess, and resolve challenges in dairy operations using a blend of theoretical understanding and hands-on experience.

***PO3 Employability Skills:***

Students will demonstrate essential workplace competencies including effective communication, teamwork, leadership, adaptability, time management, and professional ethics for improved employability in the dairy sector.

***PO4 Industry Relevance and entrepreneurial abilities:***

Students will be equipped with industry-relevant skills and entrepreneurial capabilities, empowering them to start and manage dairy-based businesses, cooperative ventures, or self-employment projects.

***PO5 Ethical and Social Responsibility:***

Students will recognize and apply ethical principles and social responsibilities in dairy practices, ensuring consumer safety, fair trade, and compliance with industry regulations.

***PO6 Environmental Awareness:*** Students will understand and apply eco-friendly and sustainable practices in dairy production, focusing on climate change mitigation, pollution control, and effective waste and water management.

***PO7 Research and Innovations:***

Students will gain exposure to research methodologies and innovative practices, enabling them to contribute to process improvements, product development, and scientific advancements in dairy technology.

***PO8 Global Perspective:***

Students will understand international trends, standards, and market demands in the dairy industry, enabling them to adapt to global practices and opportunities.

***PO9 Multidisciplinary studies:*** Students will integrate knowledge from microbiology, food science, engineering, management, and ICT to build a comprehensive skill set relevant to diverse roles in the dairy and food sector.

***PO10 Community Engagement:*** Students will engage in socially responsible activities and extension services to promote rural development, nutrition, public health, and sustainable livelihoods through dairy-based initiatives.



**Anekant Education Society's**  
**Tuljaram Chaturchand College**  
**of Arts, Science and Commerce Baramati, Dist-Pune**  
*(Empowered Autonomous)*

**Board of Studies in Dairy Technology**

**(Academic Year 2025-26 to 2027-28)**

Sr.No.	Name of Member	Designation
1.	<b>Mr. Khan Wajid A.</b> Assistant Professor Department of Dairy Technology, T. C. College, Baramati.	<b>Chairperson</b>
2.	<b>Mrs. Ganbote Shruti S.</b> Assistant Professor, Department of Dairy Technology, T. C. College, Baramati	Member
3.	<b>Ms. Patil Pallavi R.</b> Assistant Professor, Department of Dairy Technology, T. C. College, Baramati	Member
4.	<b>Ms. Pawar Aishwarya R.</b> Assistant Professor, Department of Dairy Technology, T. C. College, Baramati	Member
5.	<b>Mrs. Sujata Patil</b>	Vice-Chancellor Nominee Subject Expert from SPPU, Pune
6.	<b>Dr. Khojare Ajit S.</b>	Subject Expert from Outside the Parent University
7.	<b>Dr. Pathan Fayaz L.</b>	Subject Expert from Outside the Parent University
8.	<b>Mr. Bhapkar Sandeep</b>	Representative from industry/corporate sector/allied areas
9.	<b>Mr. Chavan Shubham</b>	Member of the College Alumni
10.	<b>Mr. Shrey Chavan</b>	UG Student



### Credit Distribution Structure for F. Y. B. Voc. – 2025 – 2026 (Dairy Technology)

Leve l	Se mester	Major		Minor	OE	VSC,SEC, (VSEC)	AEC,VEC,IKS	OJT, FP,CEP, CC,RP	Cum. Cr/Se m	Degree/Cu m.Cr.
		Mandatory	Electi ves							
4.5	I	DRT-101- MJM: Dairy Technology (2credits)	--	--	DRT -107-OE: Introduction to Milk Processing (2credits)	DRT -108-SEC: Soft skill Development (2credits)	ENG-101-AEC Functional English- I(2credit)	--	22	UG Certificate 44credits
		DRT -102- MJM: Practical's of Dairy Technology (2credits)					DRT -105-VEC: Environmental Education (2credits)			
		DRT -103- MJM: Dairy Chemistry - I (2credits)								
		DRT -104- MJM: Chemical analysis of milk - I (2credits)					DRT -106-IKS: Generic (2credits)			
		DRT -105- MJM: Dairy Microbiology - I (2credits)								
		DRT -106- MJM: Microbial Analysis of								

		Milk -I (2credits)							
II	DRT -151- MJM:Market Milk (2 credits)	--		DRT -157-OE: Practical's of Dairy Technology - (2credits)	DRT -158-SEC Computer skills (2credits)	ENG-151-AEC Functional English- II(2credit)	CC (2credit)	22	
	DRT -152- MJM: Practicals of Market milk (2 credits)					DRT -155-VEC: Digital and Technological Solutions (2credits)			
	DRT -153- MJM: Dairy Chemistry (2 credits)								
	DRT -154- MJM: Practicals of Dairy Chemistry (2 credits)								
	DRT -155- MJM: Dairy Microbiology (2 credits)								
	DRT -156- MJM: Practical Microbial analysis of milk (2 credits)								
Cu m Cr.	<b>24</b>	--	--	4	4	10	2	44	

**Course Structure for F. Y. B. Voc. Dairy Technology (2025 Pattern)**

Sem	Course Type	Course Code	Course Name	Theory /Practical	Credits
I	DSC – I (General)	DRT - 101 - GEN	Dairy Technology	Theory	02
		DRT - 102 - GEN	Practical's of Dairy Technology	Practical	02
	DSC – II (General)	DRT - 103 - GEN	Dairy Chemistry - I	Theory	02
		DRT - 104 - GEN	Practical's of Dairy Chemistry - I	Practical	02
	DSC – III (General)	DRT - 105 - GEN	Dairy Microbiology - I	Theory	02
		DRT - 106 - GEN	Practical's of Dairy Microbiology - I	Practical	02
	Open Elective (OE)	DRT - 107 - OE	Introduction to Milk Processing	Theory	02
	Skill Enhancement Course (SEC)	DRT - 108 - SEC	Soft skill development	Practical	02
	Indian Knowledge System (IKS)	GEN - 106 - IKS	General	Theory	02
	Ability Enhancement Course (AEC)	ENG - 101 - AEC	Functional English-I	Theory	02
	Value Education Course (VEC)	ENV - 105 - VEC	Environmental Education	Theory	02
<b>Total Credits Semester- I</b>					<b>22</b>
II	DSC – I (General)	DRT - 151 - GEN	Market Milk	Theory	02
		DRT - 152 - GEN	Practical's of Market Milk	Practical	02
	DSC – II (General)	DRT - 153 - GEN	Dairy Chemistry - II	Theory	02
		DRT - 154 - GEN	Practical's of Dairy Chemistry - II	Practical	02
	DSC – III (General)	DRT - 155 - GEN	Dairy Microbiology - II	Theory	02
		DRT - 156 - GEN	Practical's of Dairy Microbiology - II	Practical	02
	Open Elective (OE)	DRT - 157 - OE	Practical's of Dairy Technology	Practical	02
	Skill Enhancement Course(SEC)	DRT - 158 - SEC	Computer Skills	Practical	02
	Ability Enhancement Course(AEC)	ENG - 154 - AEC	Functional English-II	Theory	02
	Value Education Course(VEC)	COS - 155 - VEC	Digital & technological Solutions	Theory	02
	Co-curricular Course(CC)	YOG/PEC/CU L/NSS/NCC - 156 - CC	To be selected from the Basket	-	02
<b>Total Credits Semester II</b>					<b>22</b>
<b>Cumulative Credits Semester I and II</b>					<b>44</b>

**CBCS Syllabus as per NEP 2020 for F. Y. B. Voc.  
Dairy Technology (2025 Pattern)**

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

**Programme Code** : DRT

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

**Semester** : II

**Course Type** : Major Mandatory

**Course Code** : DRT-151-GEN

**Course Title** : Market Milk

**No. of Credits** : 02

**No. of Teaching Hours** : 30

**Course Objectives:**

- To know importance of dairy Technology.
- To study the methods of the collection and transportation of milk.
- To study hygiene and sanitation in dairy industry.
- To know the processing and packaging materials and machineries for milk and milk products.
- To study different milk processing techniques like pasteurization and sterilization.
- To study and resolve processing related errors.
- To study types of milk available in market.

**Course Outcomes:**

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

**CO1.** Students will get acquainted with the different milk processes.

**CO2.** They will learn about different types of milk.

**CO3.** They will learn about reception & storage of milk.

**CO4.** They will acquire information on fundamentals of milk processing.

**CO5.** They will be able to solve processing related errors.

**CO6.** They will learn about different methods of pasteurizing milk

**CO7.** They will learn about sterilization of milk and ultra high temperatures for milk processing.

### Topic sand Learning Points

**Unit-1: Milk Reception:** Milk Collection and Transportation, Milk Reception at the Dairy Dock, Milk Chilling and Storage **07 P**

**Unit-2: Processing of milk:** Clarification, Separation, Bactofugation and Standardization Pasteurization and Homogenization **07 P**

**Unit-3: Sterilization and Ultra-High-Temperature Processing**

Definition, Quality of sterilized milk, Ultra-High temperature processing, Changes in milk during processing, Aseptic packaging, Types of packaging materials, Description of aseptic packaging systems. **08 P**

**Unit-4: Special Milks:** Sterilized milk, Homogenized milk, flavored milk, toned milk, double toned milk, Standardized milk, rehydrated milk, recombinant milk, UHT milk. **08 P**

**References:**

- Outlines of Dairy Technology, (1980) Sukumar De
- The technology of milk processing, (1991) Khan A.Q
- Manual for milk plant operations, (1957) Washington
- Food engineering and Dairy technology (1981) Kessler H.G.

**Choice Based Credit System Syllabus (2025 Pattern)**

**(As Per NEP 2020)**

**Mapping of Program Outcomes with Course Outcomes**

**Class** : F. Y. B. Voc. (Sem-II)

**Subject** : Dairy Technology

**Course** : Market Milk

**Course Code** : DRT-151-GEN

**Weightage:** 1=weak or low relation, 2=moderate or partial relation, 3=strong or direct relation

<b>Course Outcomes</b>	<b>Programme Outcomes(POs)</b>									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	1	1	1	2	2	2	2	1	3
CO2	1	3	1	1	3	1	1	1	3	2
CO3	2	2	3	2	1	3	3	1	1	1
CO4	1	3	1	3	3	1	3	1	1	1
CO5	1	1	2	1	3	2	1	1	3	2
CO6	1	3	3	2	2	2	1	3	1	1
CO7	2	1	3	3	1	1	1	1	1	1

### **Justification for the mapping**

#### **PO2 Problem Solving Skills**

CO6. Understand about Entrepreneurship and Dairy Management in India.

#### **PO3 Employability Skill**

CO3. Understand different government policies for dairy in India.

CO6. Understand about Entrepreneurship and Dairy Management in India.

CO7. Understand the Dairy Development in India.

#### **PO4 Industry Relevance and entrepreneurial abilities**

CO6. Understand about Entrepreneurship and Dairy Management in India.

CO7. Understand the Dairy Development in India.

#### **PO5 Ethical and Social Responsibility**

CO1. Understand the importance of Dairy Technology.

CO2. Explain milk and its composition.

CO4. Understand scope of dairy technology.

CO5. Understand the composition and nutritive value of milk.

#### **PO6 Environmental Awareness**

CO3. Understand different government policies for dairy in India.

#### **PO7 Research and Innovations**

CO4. Understand scope of dairy technology.

CO6. Understand about Entrepreneurship and Dairy Management in India.

#### **PO8 Global Perspective**

CO6. Understand about Entrepreneurship and Dairy Management in India.

CO7. Understand the Dairy Development in India.

**PO9 Multidisciplinary studies**

CO2. Explain milk and its composition.  
CO5. Understand the composition and nutritive value of milk.

**PO10 Community Engagement**

CO1. Understand the importance of Dairy Technology.  
CO5. Understand the composition and nutritive value of milk.

## CBCS Syllabus as per NEP 2020 for F. Y. B. Voc. Dairy Technology (2025 Pattern)

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

**Programme Code** : DRT

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

**Semester** : II

**Course Type** : Major Mandatory

**Course Code** : DRT -152-GEN

**Course Title** : Practical's of Market Milk

**No. of Credits** : 02

**No. of Teaching Hours** : 30

### Course Objectives:

- To study the methods of the collection and transportation of milk.
- To study hygiene and sanitation in dairy industry.
- To study about storage of milk.
- To study about processing of milk in dairy industries.
- To study about Bactofugation.
- To study about Ultra-High Temperatures.
- To study about varieties of special milks.

### Course Outcomes:

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

**CO1.** Students will know about the collection and transportation of milk.

**CO2.** They will get to know about hygiene and sanitation in dairy industry.

**CO3.** They will know about the different varieties of special milks.

**CO4.** They will achieve information about storage of milk in dairy industries.

**CO5.** They will understand processing of milk in dairy industries.

**CO6.** They will study about Bactofugation.

**CO7.** They will study about Ultra-High Temperatures.

### Topics and Learning Points

1. Study of Pasteurizer
2. Study of homogenizer
3. Preparation of Sterilized milk
4. Preparation of Pasteurized milk
5. Preparation of Homogenized milk

6. Preparation of Flavored milk
7. Preparation of Recombinant milk
8. Preparation of Rehydrated milk
9. Preparation of Standardized milk
10. Preparation of Skim, Toned and Double toned milk

**References:**

- Outlines of Dairy Technology, (1980) Sukumar De
- The technology of milk processing, (1991) Khan A.Q
- Manual for milk plant operations, (1957) Washington
- Food engineering and Dairy technology (1981) Kessler H.G.

**Choice Based Credit System Syllabus (2025 Pattern)****(As Per NEP 2020)****Mapping of Program Outcomes with Course Outcomes****Class : F. Y. B. Voc. (Sem-II)****Subject : Dairy Technology****Course : Practical's of market milk****Course Code : DRT-152-GEN****Weightage:** 1=weak or low relation, 2=moderate or partial relation, 3=strong or direct relation

<b>Course Outcomes</b>	<b>Programme Outcomes(POs)</b>									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	3	1	2	1	1	3	1	2	3
CO2	3	3	2	3	3	3	2	1	1	3
CO3	3	1	1	3	1	1	1	3	3	3
CO4	3	3	3	1	3	3	1	1	1	3
CO5	2	3	2	2	1	3	2	3	1	2
CO6	2	1	1	2	1	1	3	1	1	2
CO7	3	1	1	3	1	1	3	1	1	3

**Justification for the mapping****PO1: Disciplinary Knowledge:**

All of the course outcomes (COs) contribute to the development of student's disciplinary

knowledge in Dairy Technology. For example, CO1, CO2 require students to master in concept of food safety and its importance along with the hazards of consumption of unsafe food. CO 3 and CO4 require students to apply knowledge of sanitary practices to prevent risks of food borne illnesses. CO5 requires students to apply their knowledge in developing different packaging to ensure food safety. CO6 Get knowledge about packaging methods which can prevent food contamination

CO7 Will know about the properties and uses of different detergent, sanitizers and cleaning agents.

**PO2: Problem Solving Skills:** CO1: Students will know about the collection and transportation of milk. Addressing logistical challenges in milk transportation involves problem-solving to ensure efficient operations. CO2: They will get to know about hygiene and sanitation in the dairy industry. Implementing effective sanitation measures requires critical thinking to solve potential contamination issues. CO4: They will achieve information about storage of milk in dairy industries. Solving issues related to milk spoilage and storage conditions requires innovative problem-solving approaches. CO5: They will understand processing of milk in dairy industries. Processing challenges, such as maintaining quality during production, require effective problem-solving skills.

**PO3: Employability Skills:** CO2: They will get to know about hygiene and sanitation in the dairy industry. Knowledge of hygiene standards is essential for employability in food safety and quality assurance roles. CO4: They will achieve information about storage of milk in dairy industries. Understanding storage requirements is crucial for roles in logistics and supply chain management within the dairy sector. CO5: They will understand processing of milk in dairy industries. Proficiency in milk processing techniques enhances employability in various dairy production roles.

#### **PO4: Industry Relevance and Entrepreneurial Abilities:**

CO1: Students will know about the collection and transportation of milk. Effective collection and transportation practices are crucial for industry success and innovation in dairy ventures. CO2: They will get to know about hygiene and sanitation in the dairy industry. Understanding sanitation is key to developing products that meet industry safety standards and consumer expectations.

CO3: They will know about the different varieties of special milks. Knowledge of diverse milk products supports entrepreneurial opportunities in niche markets. CO5: They will understand processing of milk in dairy industries. Processing knowledge is vital for developing competitive products and meeting market demands.

CO6: They will study about Bactofugation. Understanding advanced processing techniques like Bactofugation can lead to innovation and competitive advantage in the industry.

CO7: They will study about Ultra-High Temperatures (UHT). Knowledge of UHT processing is essential for creating long shelf-life products, enhancing marketability.

#### **PO5: Ethical and Social Responsibility:**

CO2: They will get to know about hygiene and sanitation in the dairy industry. Commitment to hygiene practices reflects ethical responsibilities towards consumer safety and public health.

CO4: They will achieve information about storage of milk in dairy industries. Ethical considerations in waste reduction and sustainability are important in milk storage practices.

#### **PO6: Environmental Awareness:**

CO2: They will get to know about hygiene and sanitation in the dairy industry. Proper sanitation practices contribute to environmental sustainability by minimizing waste and pollution.

CO4: They will achieve information about storage of milk in dairy industries. Effective storage solutions can reduce environmental impact through efficient use of resources.

CO5: They will understand processing of milk in dairy industries. Sustainable processing methods help in minimizing environmental degradation while maintaining product quality.

**PO7: Research and Innovations:**

CO5: They will understand processing of milk in dairy industries. | Innovation in processing techniques leads to improved efficiency and product quality in the dairy industry.

CO6: They will study about Bactofugation. Bactofugation represents an innovative approach to enhancing dairy safety and quality through research-driven techniques.

CO7: They will study about Ultra-High Temperatures (UHT). UHT technology is a result of ongoing research and innovation aimed at improving product shelf life and safety.

**PO8: Global Perspective:**

CO3: They will know about the different varieties of special milks. Awareness of global dairy practices and diverse milk products fosters a broader understanding of international markets.

CO5: They will understand processing of milk in dairy industries. Understanding processing techniques from a global perspective can inform best practices and innovations in the industry.

**CBCS Syllabus as per NEP 2020 for F. Y. B. Voc.  
Dairy Technology (2025 Pattern)**

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

**Programme Code** : DRT

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

**Semester** : II

**Course Type** : Major Mandatory

**Course Code** : DRT -153-GEN

**Course Title** : Dairy Chemistry - II

**No. of Credits** : 02

**No. of Teaching Hours** : 30

**Course Objectives:**

- To understand the milk and its composition
- To know the milk components and their properties.
- To study the factors affecting milk coagulation.
- To study the enzymes present in milk
- To understand the structure of Milk fat globule
- To study the nutritional benefits of milk
- They will be able to understand correlation of different components of milk

**Course Outcomes:**

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

**CO1.** Understand the chemical make-up of milk.

**CO2.** Explain the features of fat globule membrane

**CO3.** Identify and classify major milk components

**CO4.** Explain the stages and factors involved in Maillard reaction

**CO5.** Understand the role of the fortification with vitamin D

**CO6.** Understand the nutritional benefits of milk

**CO7.** Understand correlation of different components of milk

**Topics and Learning Points**

**Unit-1: Chemistry of Dairy Products:**

Market Milk : Physico-chemical changes during pasteurization, UHT treatment and sterilization

Fermented Products: Acid and enzyme induced gel formation ,role of starter culture ,Proteolysis and lipolysis during ripening.

Butter and Ghee: Chemistry of churning, phase inversion and flavor compounds in butter and ghee. **10P**

**Unit-2: Chemistry of milk:**

Milk as a dispersed system, acid base equilibrium of milk,  
Heat induced changes : Whey protein, browning , caramelization and cooked flavor **06P**

**Unit-3: Milk Enzymes and Pigments :**

Indigenous enzymes, Role of enzyme in flavor development in dairy processing ,Pigments in dairy processing. **06 P**

**Unit 4:Milk Vitamins and Minerals:**

Unsaponifiable matter and fat soluble vitamins.

Milk Salts: Mineral in milk.

(a) major mineral.

(b) Trace elements.

Physical equilibrium among the milk salts and Milk contact surfaces and metallic contamination.

**08P**

**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

**Choice Based Credit System Syllabus (2025 Pattern)**

**(As Per NEP 2020)**

**Mapping of Program Outcomes with Course Outcomes**

**Class** : F. Y. B. Voc. (Sem-II)

**Subject** : Dairy Technology

**Course** : Dairy Chemistry - II

**Course Code** : DRT-153-GEN

**Weightage:** 1=weak or low relation, 2=moderate or partial relation, 3=strong or direct relation

<b>Course Outcomes</b>	<b>Programme Outcomes(POs)</b>									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	1	1	1	2	3	2	2	3	2
CO2	1	3	2	2	3	1	3	3	2	3
CO3	1	1	2	2	1	2	1	1	1	1
CO4	2	3	3	2	1	3	2	1	2	2
CO5	1	1	2	3	3	3	1	3	1	2

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CO6	2	1	3	1	2	2	1	3	1	2
CO7	1	2	3	3	1	1	2	1	2	1

### Justification for the mapping

#### **PSO1: Technical Competence:**

CO1: Students will acquire comprehensive knowledge of chemicals used in milk analysis.

CO4: Students will gain exposure to the instruments employed in milk analysis.

CO7: Students will be able to prepare chemicals of different normality used for milk analysis.

#### **PO2 Problem Solving Skills**

CO2: Students will critically analyze standard values of quality parameters in milk.

CO3: Students will develop the ability to examine and evaluate the quality of milk.

CO6: Students will demonstrate critical thinking skills by performing different platform tests for milk.

#### **PO4 Industry Relevance and entrepreneurial abilities:**

CO3: Students will develop competence in examining the quality of milk.

CO4: Exposure to instruments will contribute to personal and professional competence.

#### **PO5 Ethical and Social Responsibility**

CO5.Understand the role of the fortification with vitamin D

#### **PO7 Research and Innovations:**

CO1: Students will engage in research by acquiring knowledge of chemicals used in milk analysis.

CO2: Students will conduct research by understanding standard values of quality parameters in milk.

#### **PO8 Global Perspective**

CO5.Understand the role of the fortification with vitamin D

#### **PO9 Multidisciplinary studies:**

CO5: Students will understand the functions of all the chemicals used for milk analysis.

CO6: Performing different platform tests for milk will encourage self-directed learning.

#### **PO10: Community Engagement:**

CO6. Understand the nutritional benefits of milk

**CBCS Syllabus as per NEP 2020 for F. Y. B. Voc.  
Dairy Technology (2025 Pattern)**

<b>Name of the Programme</b>	: B. Voc. Dairy Technology
<b>Programme Code</b>	: DRT
<b>Class</b>	: F .Y. B. Voc.
<b>Semester</b>	: II
<b>Course Type</b>	: Major Mandatory
<b>Course Code</b>	: DRT-154-GEN
<b>Course Title</b>	: Practical's of Dairy Chemistry- II
<b>No. of Credits</b>	: 02
<b>No. of Teaching Hours</b>	: 60

**Course Objectives:**

- Students will get vast knowledge of chemicals used for milk analysis.
- They will understand standard values of quality parameters.
- They will be able to examine the quality of the milk.
- They will get exposure to the instruments of analysis.
- They will understand the functions of all the chemicals used for the analysis.
- They will be able to perform different platform test for milk.
- They will be able to prepare chemicals of different normality used for milk analysis.

**Course Outcomes:**

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

**CO1.** Knowledge of chemicals used for milk analysis.

**CO2.** Explain standard values of quality parameters.

**CO3.** Examine the quality of the milk

**CO4.** Explain the common milk adulterants

**CO5.** Explain various instruments of analysis

**CO6.** Understand different platform test for milk in dairy industry.

**CO7.** Understand the functions of all the chemicals used for the analysis.

**Topics and Learning Points**

1. Study of Equipments in Laboratory
2. Sampling of milk products
3. Study of Gerber Centrifuge
4. Determination of Fat by Gerber Method

5. Determination of specific gravity of milk
6. Determination of moisture content of milk products
7. Determination of acidity of milk products
8. Determination of protein by Kjeldahl's method
9. Detection of adulterants in milk - I
10. Detection of adulterants in milk- II

### 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

### Choice Based Credit System Syllabus (2025 Pattern)

(As Per NEP 2020)

### Mapping of Program Outcomes with Course Outcomes

**Class** : F. Y. B. Voc. (Sem-I)

**Subject** : Dairy Technology

**Course** : Practical's of Dairy Chemistry- II

**Course Code** : DRT-154-GEN

**Weightage:** 1=weak or low relation, 2=moderate or partial relation, 3=strong or direct relation

Course Outcomes	Programme Outcomes(POs)									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	1	3	3	3	1	2	1	3	3
CO2	1	2	1	3	1	2	1	2	2	1
CO3	1	3	1	1	2	1	1	1	1	1
CO4	3	1	2	1	3	1	2	2	1	1
CO5	1	3	2	3	2	2	1	3	2	2
CO6	1	3	1	3	1	1	1	3	2	1
CO7	3	1	1	1	3	3	3	2	1	3

### Justification for the mapping

#### PO1: Technical Competence:

CO1: Students will acquire comprehensive knowledge of chemicals used in milk analysis.

CO4: Students will gain exposure to the instruments employed in milk analysis.

CO7: Students will be able to prepare chemicals of different normality used for milk analysis.

#### PO2: Problem Solving Skills :

CO2: Students will critically analyze standard values of quality parameters in milk.

CO3: Students will develop the ability to examine and evaluate the quality of milk.

CO6: Students will demonstrate critical thinking skills by performing different platform tests for milk.

**PO4 Industry Relevance and entrepreneurial abilities::**

CO3: Students will develop competence in examining the quality of milk.

CO4: Exposure to instruments will contribute to personal and professional competence.

**PO7 Research and Innovations:**

CO1: Students will engage in research by acquiring knowledge of chemicals used in milk analysis.

CO2: Students will conduct research by understanding standard values of quality parameters in milk.

**PO9 Multidisciplinary studies:**

CO5: Students will understand the functions of all the chemicals used for milk analysis.

CO6: Performing different platform tests for milk will encourage self-directed learning.

**CBCS Syllabus as per NEP 2020 for F. Y. B. Voc.  
Dairy Technology (2025 Pattern)**

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

**Programme Code** : DRT

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

**Semester** : II

**Course Type** : Major Mandatory

**Course Code** : DRT-155-GEN

**Course Title** : Dairy Microbiology-II

**No. of Credits** : 02

**No. of Teaching Hours** : 30

**Course Objectives:**

- Students will learn about microbial make-up of milk.
- They will understand the microorganisms of commercial importance.
- They will get acquainted with the different methods of microbial analysis.
- They will know the overall effect of microbial action on milk.
- They will know the types of organisms, beneficial & harmful microorganisms.
- They will learn about different staining methods which are used in microbiology.
- They will be able to demonstrate different isolation of pure culture techniques.

**Course Outcomes:**

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

**CO1.** Students will learn about microbial make-up of milk.

**CO2.** They will understand the microorganisms of commercial importance.

**CO3.** They will get acquainted with the different methods of microbial analysis.

**CO4.** They will know the overall effect of microbial action on milk.

**CO5.** They will know the types of organisms, beneficial & harmful microorganisms.

**CO6.** They will learn about different staining methods which are used in microbiology.

**CO7.** They will be able to demonstrate different isolation of pure culture techniques.

**Topics and Learning Points**

**Unit 1: Culture media & Pure culture techniques:** Definition & Introduction to culture media  
Classification of culture media – Based on ingredients and Based on applications, Pure culture techniques- Streak plate technique, Pour plate method, Spread plate method. **8 Periods**

**Unit 2: Stain & Staining Techniques:** Definition & Introduction to dye and stain, Classification of stains, Methods of staining – Simple staining, Negative staining, Gram staining, Acid fast staining **7 Periods**

**Unit-3: Beneficial microorganisms and microbial spoilage:** Microbial food fermentation, food spoilage, microbial spoilage of milk and milk products , microbial spoilage of fruits and vegetables , Food in relation to disease- Food borne poisoning ,infections and intoxications. **8Periods**

**Unit-4: Control Of Microorganisms :** Physical Means of control of microorganisms – Temperature, Osmotic pressure, Radiations, Filtration, Chemical means of control of microorganisms- Phenol & phenolic compounds, Halogens, alcohol, Iodine **7 Periods**

### References:

- Food Microbiology (2013) William C Frazier
- Dairy Microbiology (2005) Richard K. Robinsons
- Dairy Microbiology : A Practical approach PhotisPapademas (2014)

### Choice Based Credit System Syllabus (2025 Pattern)

(As Per NEP 2020)

### Mapping of Program Outcomes with Course Outcomes

**Class** : F. Y. B. Voc. (Sem-II)

**Subject** : Dairy Technology

**Course** : Dairy Microbiology-II

**Course Code** : DRT-155-GEN

**Weightage:** 1=weak or low relation, 2=moderate or partial relation, 3=strong or direct relation

Course Outcomes	Programme Outcomes(POs)									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
<b>CO1</b>	1	2	1	2	1	3	2	3	3	3
<b>CO2</b>	1	1	1	3	3	2	3	3	2	1
<b>CO3</b>	2	3	2	1	3	3	2	1	2	3
<b>CO4</b>	1	2	1	3	3	2	3	1	1	1
<b>CO5</b>	3	2	2	3	1	2	2	3	2	1
<b>CO6</b>	2	3	3	1	3	3	1	3	1	2
<b>CO7</b>	2	1	1	1	3	3	1	3	3	3

**Justification for the mapping****PSO1: Technical Competence**

All of the course outcomes (COs) contribute to the development of students' disciplinary knowledge in Dairy Technology. For example, CO1, and CO2 require students to get knowledge about Dairy Microbiology. CO3 require students to apply suitable techniques for analysis of milk.

**PO2 Problem Solving Skills**

All of the COs also contributes to the development of students' critical thinking and problem-solving skills. For example, CO3, and CO4 require students to think critically about different techniques for microbial analysis, overall effect of microbial action on milk. CO5 require students to use their knowledge and think critically on types of organisms, beneficial and harmful microorganisms in Milk.

**PO3 Employability Skills**

CO2, CO3, CO4, CO5, CO6 and CO7 all contribute to the development of students' professional competence. For example, all of the COs require students to develop their ability to work independently and as part of a team.

**PO5 Ethical and Social Responsibility:**

CO2, CO3, CO5 contribute towards the development of ethics in Microbiology of milk and milk products.

**PO6 Environmental Awareness**

CO5 will contribute to the types of organisms, beneficial & harmful microorganisms .

**PO7 Research and Innovations :**

CO2, CO3, CO4, and CO5 contribute to the development of students' research related skills. For example, CO5 requires students to learn how to perform different methods of microbial analysis. CO7 requires student to learn to demonstrate different isolation of pure culture techniques.

**PO9 Multidisciplinary studies:**

All of the course outcomes (COs) contribute to the development of students' life long learning in Dairy Technology. For example, CO1, CO2, CO3, CO4 and CO5 require students to get lifelong knowledge about microbiology of milk and milk products. CO6 and CO7 require students to get knowledge about methods of staining and methods of isolation of pure starter culture.

**PO10 Community Engagement:**

CO2. They will understand the microorganisms of commercial importance.

**CBCS Syllabus as per NEP 2020 for F. Y. B. Voc.  
Dairy Technology (2025 Pattern)**

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

**Programme Code** : DRT

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

**Semester** : II

**Course Type** : Major Mandatory

**Course Code** : DRT-156-GEN

**Course Title** : Practical's of Dairy Microbiology - II

**No. of Credits** : 02

**No. of Teaching Hours** : 60

**Course Objectives:**

- Students will learn about microbial make-up of milk.
- They will understand the microorganisms of commercial importance.
- They will get acquainted with the different methods of microbial analysis.
- They will know the overall effect of microbial action on milk.
- They will know the types of organisms, beneficial & harmful microorganisms .
- They will learn about different staining methods which is used in microbiology.
- They will be able to demonstrate different isolation of pure culture techniques.

**Course Outcomes:**

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

**CO1.** Students will learn about microbiology in milk

**CO2.** They will understand the microorganisms of commercial importance & its use for industrial production.

**CO3.** They will get acquainted with the different methods of microbial analysis & microbial sampling

**CO4.** They will know the overall effect of microbial action on milk as well as effect on environmental factors on microbial growth.

**CO5.** They will know the types of organisms, beneficial & harmful microorganisms .

**CO6.** They will learn about different staining methods which is used in microbiology.

**CO7.** They will be able to demonstrate different isolation of pure culture techniques.

### Topics and Learning Points

1. Study of simple staining
2. Study of Gram staining
3. Study of negative staining
4. Study of streak plate technique
5. Study of spread plate technique
6. Study of pour plate technique
7. Study of total plate count
8. Isolation of halophilic bacteria
9. Qualitative analysis of drinking water
10. Activity

### References:

- Food Microbiology (2013) William C Frazier
- Dairy Microbiology (2005) Richard K. Robinsons
- Dairy Microbiology : A Practical approach Photis Papademas (2014)

## Choice Based Credit System Syllabus (2025 Pattern) (As Per NEP 2020)

### Mapping of Program Outcomes with Course Outcomes

**Class** : F. Y. B. Voc. (Sem-II)

**Subject** : Dairy Technology

**Course** : Practical's of Dairy Microbiology – II

**Course Code** : DRT-156-GEN

**Weightage:** 1=weak or low relation, 2=moderate or partial relation, 3=strong or direct relation

<b>Course Outcomes</b>	<b>Programme Outcomes(POs)</b>									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
<b>CO1</b>	1	3	1	1	1	1	2	3	1	1
<b>CO2</b>	2	1	1	3	1	2	1	3	2	2
<b>CO3</b>	2	3	2	3	3	1	2	1	2	1
<b>CO4</b>	1	2	2	3	1	2	1	1	3	3

<b>CO5</b>	3	2	2	3	3	2	2	1	2	3
<b>CO6</b>	2	3	3	1	3	3	3	3	1	3
<b>CO7</b>	2	1	3	1	3	1	1	3	3	1

### Justification for the mapping

#### **PSO1: Technical Competence:**

All of the course outcomes (COs) contribute to the development of students' disciplinary knowledge in Dairy Technology. For example, CO1, and CO2 require students to get knowledge about Dairy Microbiology. CO3 require students to apply suitable techniques for analysis of milk.

#### **PO2 Problem Solving Skills**

All of the COs also contributes to the development of students' critical thinking and problem-solving skills. For example, CO3, and CO4 require students to think critically about different techniques for microbial analysis, overall effect of microbial action on milk. CO5 require students to use their knowledge and think critically on types of organisms, beneficial and harmful microorganisms in Milk.

#### **PO6 Environmental Awareness:**

CO3 and CO4 contribute to the development of students' research-related skills and scientific temper towards microbial analysis and overall effect of microbial action on milk. For example, CO3 requires students to learn different methods of microbial analysis. CO4 require students to develop their ability to think critically about effect of microorganisms on milk.

#### **PO7 Research and Innovations :**

CO2, CO3, CO4, and CO5 contribute to the development of students' research related skills. For example, CO5 requires students to learn how to perform different methods of microbial analysis. CO7 requires student to learn to demonstrate different isolation of pure culture techniques.

#### **PO3 Employability Skills**

CO2, CO3, CO4, CO5, CO6 and CO7 all contribute to the development of students' professional competence. For example, all of the COs require students to develop their ability to work independently and as part of a team.

#### **PO5 Ethical and Social Responsibility:**

CO2, CO3, CO5 contribute towards the development of ethics in Microbiology of milk and milk products.

#### **PO9 Multidisciplinary studies:**

All of the course outcomes (COs) contribute to the development of students' life long learning in Dairy Technology. For example, CO1, CO2, CO3, CO4 and CO5 require students to get lifelong knowledge about microbiology of milk and milk products. CO6 and CO7 require students to get knowledge about methods of staining and methods of isolation of pure starter culture.

**PO10 Community Engagement:**

CO2. They will understand the microorganisms of commercial importance.

**CBCS Syllabus as per NEP 2020 for F. Y. B. Voc.  
Dairy Technology (2025 Pattern)**

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

**Programme Code** : DRT

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

**Semester** : II

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

**Course Code** : DRT-157-OE (P)

**Course Title** : Practical's of Dairy Technology

**No. of Credits** : 02

**No. of Teaching Hours** : 30

**Course Objectives:**

- To learn about the concept of Dairy Technology.
- To know about the importance of milk processing.
- To understand different types of milk quality tests in dairy industry.
- To know the processing of milk in dairy industry.
- To understand about milk preservation techniques.
- To study about manufacturing of different types of milk available in market.
- To study about packaging of milk and milk products.

**Course Outcomes:**

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

**CO1:** Concept of Dairy Technology.

**CO2:** Importance of milk processing.

**CO3:** Identify and perform different types of quality tests for milk.

**CO4:** Processing of Milk in Dairy Industries.

**CO5:** Different milk preservation techniques.

**CO6:** Manufacturing process of different types of milk like flavored milk, tonned milk, sterilized milk, rehydrated milk, etc.

**CO7:** Packaging of milk and milk products.

**Topics and Learning Points**

1. Study of Pasteurizer

2. Study of homogenizer

3. Preparation of Sterilized milk
4. Preparation of Pasteurized milk
5. Preparation of Homogenized milk
6. Preparation of Flavored milk
7. Preparation of Recombinant milk
8. Preparation of Rehydrated milk
9. Preparation of Standardized milk
10. Preparation of Skim, Toned and Double toned milk

### References:

1. Krause's food & the nutrition care process / [edited by] L. Kathleen Mahan.
2. Outlines of Dairy Technology – Sukumar De
3. Handbook of Nutrition and Food, Third Edition by Carolyn D.
4. Manual of Nutritional Therapeutics by David H.

### Choice Based Credit System Syllabus (2025 Pattern) (As Per NEP 2020)

#### Mapping of Program Outcomes with Course Outcomes

**Class** : F. Y. B. Voc. (Sem-I)

**Subject** : Dairy Technology

**Course** : Practical's of Dairy Technology

**Course Code** : DRT-157-OE

**Weightage:** 1=weak or low relation, 2=moderate or partial relation, 3=strong or direct relation

<b>Course Outcomes</b>	<b>Programme Outcomes(POs)</b>									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
<b>CO1</b>	2	3	3	3	2	1	1	3	3	1
<b>CO2</b>	2	1	2	3	1	1	3	3	3	3
<b>CO3</b>	1	2	1	1	1	1	1	1	1	1
<b>CO4</b>	2	1	2	1	3	1	2	3	1	2
<b>CO5</b>	1	3	2	2	2	2	1	1	3	1
<b>CO6</b>	2	2	1	2	1	1	1	3	3	3

CO7	3	2	2	1	2	3	2	3	2	1
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### Justification for the mapping

#### **PSO1: Technical Competence:**

All of the course outcomes (COs) contribute to the development of students' disciplinary knowledge in Dairy Technology. For example, CO1, CO2, and CO3 require students to get knowledge about different milk processes, types of milk and milk storage. CO6 require students to apply suitable methods of pasteurizing milk.

#### **PO2 Problem Solving Skills**

The entire COs also contributes to the development of students' critical thinking and problem-solving skills. For example, CO1, CO2, and CO3 require students to think critically about milk processing, storage and types of milk. CO5 require students to become capable to solve processing related errors.

#### **PO3 Employability Skills:**

CO1, CO2 and CO4 contribute to the development of students' research-related skills and scientific temper towards milk processing and types of milk. For example, CO2 requires students to learn different types of milk. CO4 require students to develop their ability to think critically about fundamentals of milk processing

#### **PO4 Industry Relevance and entrepreneurial abilities**

CO2, CO3, CO4, and CO5 all contribute to the development of students' personal and professional competence. For example, all of the COs require students to know about milk processing and storage and to develop their ability to work independently and as part of a team.

#### **PO5 Ethical and Social Responsibility:**

CO2, CO3, CO5 contribute towards the development of ethics in processing of milk.

#### **PO7 Research and Innovations :**

CO1, CO2, CO3, CO4, and CO5 contribute to the development of students' research related skills. For example, CO1 requires students to learn how to apply different methods processing of milk. CO5 requires student to learn about different methods of pasteurization of milk.

#### **PO9 Multidisciplinary studies:**

All of the course outcomes (COs) contribute to the development of students' lifelong learning in processing of milk. For example, CO1, CO2, and CO3 require students to get lifelong knowledge about processing of milk and storage of milk and milk products. CO4 and CO5 require students to get knowledge about problem solving related to processing and learn about different methods of pasteurization.

#### **PO10 Community Engagement:**

CO2: Importance of milk processing.

CO4: Processing of Milk in Dairy Industries.

CO6: Manufacturing process of different types of milk like flavored milk, tonned milk, sterilized milk, rehydrated milk, etc.

All above CO's contribute to PO10: Community Engagement.

**CBCS Syllabus as per NEP 2020 for F. Y. B. Voc.  
Dairy Technology (2025 Pattern)**

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

**Programme Code** : DRT

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

**Semester** : II

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

**Course Code** : DRT-158-SEC

**Course Title** : Computer Skills

**No. of Credits** : 02

**No. of Teaching Hours** : 30

**Course Objectives:**

- To gain knowledge of operating systems
- To familiarize digital technology.
- To provide knowledge about components and characteristics of computer
- To study all the input and output devices of computer
- To study MS Word and MS Excel
- To study how to make PowerPoint presentation
- To study web browsing – how to search research papers, etc

**Course Outcomes:**

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

**CO1.** Establish and achieve knowledge of operating systems.

**CO2.** Students will be able to operate basic tasks on computer.

**CO3.** Students will gain knowledge of all the input and output devices.

**CO4.** Will be able to perform activities on MS Word and Excel.

**CO5.** Create and demonstrate effective PowerPoint presentation.

**CO6.** Develop their personality.

**CO7:** Explore formal communication mediums.

### Topics and Learning Points

#### Practical's :-

1. Introduction to Computer Operating Systems
2. Characteristics of Computer
3. Components of computer
4. Input and Output Devices
5. To study how to create MS power point presentation
6. To study how to search a research paper
7. To study basic functions of Ms word
8. To study how to create invitation letter/ resume in MS Word
9. Ms Excel – how to create mark sheet
10. Web browsing Assignment

### Choice Based Credit System Syllabus (2025 Pattern) (As Per NEP 2020)

#### Mapping of Program Outcomes with Course Outcomes

**Class** : F. Y. B. Voc. (Sem-II)

**Subject** : Dairy Technology

**Course** : Computer Skills

**Course Code** : DRT-158-SEC

**Weightage:** 1=weak or low relation, 2=moderate or partial relation, 3=strong or direct relation

<b>Course Outcomes</b>	<b>Programme Outcomes(POs)</b>									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	1	2	1	3	2	1	2	1	1
CO2	2	1	1	2	1	2	2	2	1	1
CO3	3	2	1	1	2	3	2	1	2	3
CO4	1	3	2	2	2	3	1	3	1	1
CO5	2	2	2	2	1	3	1	1	3	2
CO6	2	1	3	3	3	1	3	2	3	2

CO7	1	3	1	3	1	1	2	1	3	1
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### **Justification for the mapping**

#### **PO1 Technical Competence:**

CO4. Will be able to perform activities on MS Word and Excel.

CO5. Create and demonstrate effective PowerPoint presentation.

#### **PO2 Problem Solving Skills:**

CO1. Establish and achieve knowledge of operating systems.

CO2. Students will able to operate basic tasks on computer.

#### **PO3 Employability Skills:**

CO4. Will be able to perform activities on MS Word and Excel.

CO5. Create and demonstrate effective PowerPoint presentation.

CO6. Develop their personality.

CO7: Explore formal communication mediums.

#### **PO6 Environmental Awareness:**

CO7: They will explore and utilize formal communication mediums ethically, contributing to environmental sustainability.

#### **PO8 Global Perspective**

CO1. Establish and achieve stage daring.

CO1. Establish and achieve knowledge of operating systems

#### **PO9 Multidisciplinary studies:**

CO8: Through their journey of developing effective operating skills, students will cultivate a commitment to self-directed and lifelong learning.

#### **PO10 Community Engagement:**

CO5. Create and demonstrate effective presentations.

CO7: Explore formal communication mediums.



