LEARNING OUTCOMES BASED CURRICULUM

JOB ROLE: Dairy Product Processor

(Ref. ID: FIC/Q2004)

Sector: Dairy Processing

Grades 11 and 12

PSS CENTRAL INSTITUTE OF VOCATIONAL EDUCATION
(a constituent unit of NCERT, under Ministry of Education, Government of India)
Shyamla Hills, Bhopal- 462 002, Madhya Pradesh, India
http://www.psscive.ac.in

Gandhiji's Talisman

I will give you a talisman. Whenever you are in doubt or when the self becomes too much with you, apply the following test:

Recall the face of the poorest and the weakest man whom you may have seen and ask yourself if the step you contemplate is going to be of any use to him. Will he gain anything by it? Will it restore him to a control over his own life and destiny? In other words, will it lead to Swaraj for the hungry and spiritually starving millions?

Then you will find your doubts and your self melting away.

Learning-Outcomes Based Curriculum

Job Role: DAIRY PRODUCT PROCESSOR

NQR Code: FIC/Q2001

(Qualification Pack: Ref. Id. FIC/Q2004)

Grades 11 & 12

Pss Central Institute of Vocational Education
(a constituent unit of NCERT, under Ministry of Education, Government of India)
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LEARNING OUTCOMES BASED VOCATIONAL CURRICULUM,

Dairy Processing, Dairy Product Processor,

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FOREWORD

The PanditSunderlal Sharma Central Institute of Vocational Education (PSSCIVE), a constituent unit of National Council of Educational Research and Training (NCERT) is spearheading the efforts of developing learning outcome based vocational curriculum and courseware aimed at integrating both vocational and general qualifications to open pathways of career progression for students. It is a part of Vocationalisation of Education under SamagraShiksha. The PSS Central Institute of Vocational Education (PSSCIVE) is developing curricula under the project approved by the Project Approval Board (PAB) of SamagraShiksha of Ministry of Human Resource Development (MHRD), Govt. of India.

The main purpose of the learning outcome-based curricula is to bring about the improvement in teaching-learning process and working competences through learning outcomes embedded in the vocational subject. It is a matter of great pleasure to introduce this learning outcome-based curriculum as part of the vocational training packages for the job role of "Dairy Product Processor". The curriculum has been developed for the secondary students of vocational education and is aligned to the National Occupation Standards (NOSs) of a job role identified and approved under the National Skill Qualification Framework (NSQF).The curriculum aims to provide children with employability and vocational skills to support occupational mobility and lifelong learning. It will help them to acquire specific occupational skills that meet employers' immediate needs. The teaching process is to be performed through the interactive sessions in classrooms, practical activities in laboratories and workshops, projects, field visits, and professional experiences. The curriculum has been developed and reviewed by a group of experts and their contributions are greatly acknowledged. The utility of the curriculum will be adjudged by the qualitative improvement that it brings about in teaching-learning. The feedback and suggestions on the content by the teachers and other stakeholders will be of immense value to us in bringing about further improvement in this document.

Dinesh Prasad Saklani
Director,
National Council of Education Research and Training,

PREFACE

India today stands poised at a very exciting juncture in its saga. The potential for achieving inclusive growth are immense and the possibilities are equally exciting. The world is looking at us to deliver sustainable growth and progress. To meet the growing expectations, India will largely depend upon its young workforce. The much-discussed demographic dividend will bring sustaining benefits only if this young workforce is skilled and its potential is channelized in the right direction.

In order to fulfill the growing aspirations of our youth and the demand of skilled human resource, the Ministry of Human Resource Development (MHRD), Government of India introduced the revised Centrally Sponsored Scheme of Vocationalisation of Secondary and Higher Secondary Education that aims to provide for the diversification of educational opportunities so as to enhance individual employability, reduce the mismatch between demand and supply of skilled manpower and provide an alternative for those pursuing higher education. For spearheading the scheme, the PSS Central Institute of Vocational Education (PSSCIVE) was entrusted the responsibility to develop competency-based curricula, student workbooks, teacher handbooks and e-learning materials for the job roles in various sectors, with growth potential for employment.

The PSSCIVE firmly believes that the vocationalisation of education in the nation needs to be established on a strong footing of philosophical, cultural and sociological traditions and it should aptly address the needs and aspirations of the students besides meeting the skill demands of the industry. The curriculum, therefore, aims at developing the desired professional, managerial and communication skills to fulfill the needs of the society and the world of work. In order to honour its commitment to the nation, the PSSSCIVE has initiated the work on developing learning outcomebased curricula with the involvement of faculty members and leading experts in respective fields. It is being done through the concerted efforts of leading academicians, professionals, policy makers, partner institutions, Vocational Education and Training experts, industry representatives, and teachers. The expert group through a series of consultations, working group meetings and use of reference materials develops a National Curriculum. Currently, the Institute is working on developing curricula and courseware for over 50 job roles in various sectors, besides the curricula developed for 100 job roles

We extend our gratitude to all the contributors for selflessly sharing their precious knowledge, acclaimed expertise, and valuable time and positively responding to our request for development of curriculum. We are grateful to MHRD and NCERT

for the financial support and cooperation in realising the objective of providing competency based modular curricula and courseware to the States and other stakeholders under the PAB (Project Approval Board) approved project of *SamagraShiskha*of Ministry of Human Resource Development (MHRD), Government of India.

Finally, for transforming the proposed curriculum design into a vibrant reality, all the institutions involved in the delivery system shall have to come together with a firm commitment and they should secure optimal community support. The success of this curriculum depends upon its effective implementation and it is expected that the managers of vocational education and training system, including subject teachers will make efforts to create better facilities, develop linkages with the world of work and foster a conducive environment as per amendments made in the curriculum document.

The PSSCIVE, Bhopal remains committed in bringing about reforms in the vocational education system through the learner-centric curricula and courseware. We hope that this document will prove useful in turning out more competent Indian workforce for the 21st century.

Deepak Paliwal
Joint Director
PSS Central Institute of Vocational Education
Bhopal

ACKNOWLEDGEMENTS

On behalf of the team at the PSS Central Institute of Vocational Education (PSSCIVE) we are grateful to the members of the Project Approval Board (PAB) *of SamagraShiksha*and the officials of the Ministry of Education (MoE), Government of India for the financial support to the project for development of curricula.

We are grateful to the Director, National Council for Education, Research and Training (NCERT) for his support and guidance. We also acknowledge the contributions of our colleagues at the Technical Support Group of *SamagraShiksha*, MoE, National Skill Development Agency (NSDA) and National Skill Development Corporation (NSDC) and Food Industry Capacity Initiatives of India (FICSI) for their academic support and cooperation in the development of curricula.

We are also grateful to Dr. Rakesh Kumar Raman, Course Coordinator, Ms.. Shalu Giri (JPF), Department of Humanities, Sciences, Education and Research, PSSCIVE, Bhopal, and the experts Dr. Samlesh Kumari, Scientist, ICAR-CIAE, Bhopal, Dr. Gaurav Deswal, Scientist, ICAR-NDRI, Karnal, Haryana for their contributions in the development of this learning outcomebased curricula for the Job Role: Dairy Product Processor for Grades 11 and 12.
The contributions made by Dr. Vinay Swarup Mehrotra and his team, at PSSCIVE in the development of the curriculum for the Employability Skills (Part-A) are also duly acknowledged.

PSSCIVE Team

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1. COURSE OVERVIEW

COURSE TITLE: DAIRY PRODUCT PROCESSOR

A Dairy Product Processor is responsible for performing processing operations to produce a variety of dairy products such as curd, paneer, butter, ghee, and flavored milk etc. S/he is expected to operate different types of dairy processing equipment as well as in processing, while and utilize workplace resources efficiently.

A Dairy Product Processor must have the ability to plan, organize, prioritize, and handle work-related stress maintaining product consistency and quality. The individual must coordinate effectively with various departments. S/he should possess reading, writing, basic calculation, and communication skills. Additionally, the individual should have the physical stamina to work long hours, maintain both personal and workplace hygiene, and possess a sound understanding of food safety regulations and standards.

COURSE OBJECTIVES: On completion of the course, students should be able to:

- Apply effective oral and written communication skills to interact with people and customers;
- Identify the principal components of a computer system;
- Demonstrate the basic skills of using computer;
- Demonstrate self-management skills;
- Demonstrate the ability to provide a self-analysis in context of entrepreneurial skills and abilities;
- Demonstrate the knowledge of the importance of green skills in meeting the challenges of sustainable development and environment protection;
- Perform various tasks related to the processing, testing and handling of milk while maintaining its quality;
- Describe different types of ingredients and additives used in dairy product formulations;
- Describe the standard procedures to produce different types of dairy products;
- Perform various tasks to prepare for production of dairy products;
- Apply necessary health and safety practices to ensure food safety and personal hygiene

COURSE REQUIREMENTS: The learner should have a basic knowledge of science.

COURSE LEVEL: On completion of this course, a student can take up a higher-level course for a job role in dairy product processor, and can work in the dairy industry.

COURSE DURATION: 600 hrs.

Class11: 300 hrs.
Class12: 300 hrs.

Total: 600 hrs.

2. SCHEME OF UNITS AND ASSESSMENT

This course is a planned sequence of instructions consisting of Units meant for developing employability and vocational competencies of students of Grades 11 and 12, opting for vocational subject along with general education subjects. The unit-wise distribution of hours and marks for Grade 11 is as follows:

GRADE 11			
	Units	**No. of Hours for Theory and Practical 300**	**Max. Marks for Theory and Practical 100**
Part A	**Employability Skills**		
	Unit 1: Communication Skills – III	25	**10**
	Unit 2: Self-management Skills – III	25	
	Unit 3: Information and Communication Technology Skills – III	20	
	Unit 4: Entrepreneurial Skills – III	25	
	Unit 5: Green Skills – III	15	
	Total	**110**	**10**
Part B	**Vocational Skills**		
	Unit 1: Milk Composition and Constituents	35	40
	Unit 2: Sampling of Milk Products	25	
	Unit 3: Adulterants, Preservatives and Neutralizers in Milk	35	
	Unit4: Chemical analysis of Milk and Milk Products	30	
	Unit 5: Market Milk	40	
	Total	**165**	
Part C	**Practical Work**		
	Practical Examination	06	15
	Written Test	01	10
	Viva Voce	03	10
	Total	**10**	**35**
Part D	**Project Work/Field Visit**		
	Practical File/Student Portfolio	10	10
	Viva Voce	05	05
	Total	**15**	**15**
	Grand Total	**300**	**100**

The unit-wise distribution of hours and marks for Grade 12 is as follows:

GRADE 12			
	Units	**No. of Hours for Theory and Practical 300**	**Max. Marks for Theory and Practical 100**
Part A	**Employability Skills**		
	Unit 1: Communication Skills – IV	25	**10**
	Unit 2: Self-management Skills – IV	25	
	Unit 3: Information and Communication Technology Skills – IV	20	
	Unit 4: Entrepreneurial Skills – IV	25	
	Unit 5: Green Skills – IV	15	
	Total	**110**	**10**
Part B	**Vocational Skills**		
	Unit 1: Traditional Indian Dairy Products	35	
	Unit 2: Fat-rich Dairy Products	30	**40**
	Unit 3: Packaging of Dairy Products	35	
	Unit 4: Condensed and Dried Milk Products	30	
	Unit 5: Dairy By-products	35	
	Total	**165**	
Part C	**Practical Work**		
	Practical Examination	06	15
	Written Test	01	10
	Viva Voce	03	10
	Total	**10**	**35**
Part D	**Project Work/Field Visit**		
	Practical File/Student Portfolio	10	10
	Viva Voce	05	05
	Total	**15**	**15**
	Grand Total	**300**	**100**

3. TEACHING/TRAINING ACTIVITIES

The teaching and training activities have to be conducted in classroom, laboratory/ workshops and field visits. Students should be taken to field visits for interaction with experts and to expose them to the various tools, equipment, materials, procedures and operations in the workplace. Special emphasis should be laid on the occupational safety, health and hygiene during the training and field visits.

CLASSROOM ACTIVITIES

Classroom activities are an integral part of this course and interactive lecture sessions, followed by discussions should be conducted by trained vocational teachers. Vocational teachers should make effective use of a variety of instructional aids, such as audio-video materials, colour slides, charts, diagrams, models, exhibits, hand-outs, online teaching materials, etc. to transmit knowledge and impart training to the students.

PRACTICAL WORK IN LABORATORY/WORKSHOP

Practical work may include but not limited to hands-on-training, simulated training, role play, casebased studies, exercises, etc. Equipment and supplies should be provided to enhance hands-on learning experience of students. Only trained personnel should teach specialized techniques. A training plan that reflects tools, equipment, materials, skills and activities to be performed by the students should be submitted by the vocational teacher to the Head of the Institution.

FIELD VISITS/ EDUCATIONAL TOUR

In field visits, students will go outside the classroom to obtain specific information from experts or to make observations of the activities. A checklist of observations to be made by the students during the field visits should be developed by the Vocational Teachers for systematic collection of information by the students on the various aspects. Principals and Teachers should identify the different opportunities for field visits within a short distance from the school and make necessary arrangements for the visits. At least three field visits should be conducted in a year.

4. ASSESMENT AND CERTIFICATION

Upon successful completion of the course by the candidate, the Central/ State Examination Board for Secondary Education and the respective Sector Skill Council will certify the competencies.

The National Skills Qualifications Framework (NSQF) is based on outcomes referenced to the National Occupation Standards (NOS's), rather than inputs. The NSQF level descriptors, which are the learning outcomes for each level, include the process, professional knowledge, professional skills, core skills and responsibility. The assessment is to be undertaken to verify that individuals have the knowledge and skills needed to perform a particular job and that the learning programme undertaken has delivered education at a given standard. It should be closely linked to certification so that the individual and the employer could come to know the competencies acquired through the vocational subject or course. The assessment should be reliable, valid, flexible, convenient, cost effective and above all it should be fair and transparent. Standardized assessment tools should be used for assessment of knowledge of students. Necessary arrangements should be made for using technology in assessment of students.

KNOWLEDGE ASSESSMENT (THEORY)

Knowledge Assessment should include two components: one comprising of internal assessment and second an external examination, including theory examination to be conducted by the Board. The assessment tools shall contain components for testing the knowledge and application of knowledge. The knowledge test can be objective paper-based test or short structured questions based on the content of the curriculum.

WRITTEN TEST

It allows candidates to demonstrate that they have the knowledge and understanding of a given topic. Theory question paper for the vocational subject should be prepared by the subject experts comprising group of experts of academicians, experts from existing vocational subject experts/teachers, subject experts from university/colleges or industry. The respective Sector Skill Council should be consulted by the Central/State Board for preparing the panel of experts for question paper setting and conducting the examinations.

The blue print for the question paper may be as follows:

Duration: 3hrs

S. No.	Typology of Question	No. of Questions			
		Very Short Answer (1 mark)	Short Answer (2 Marks)	Long Answer (3 Marks)	Marks
1.	Remembering – (Knowledge based simple recall questions, to know specific facts, terms, concepts, principles, or theories; identify, define or recite, information)	2	1	2	10

2.	Understanding– (Comprehension– to be familiar with meaning and to understand conceptually, interpret, compare, contrast, explain, paraphrase, or interpret information)	1	2	2	11
3.	Application – (Use abstract information in concrete situation, to apply knowledge to new situations: Use given content to interpret a situation, private an example, or solve a problem)	0	1	1	05
4.	High Order Thinking Skills – (Analysis &Synthesis – Classify, compare, contrast, or differentiate between different pieces of information; Organize and/ or integrate unique pieces of information from a variety of sources)	0	1	0	02
5.	Evaluation – (Appraise, judge, and/or justify the value or worth of a decision or outcome, or to predict outcomes based on values)	0	1	0	02
	Total	**3x1=3**	**6x2=12**	**5x3=15**	**30 (14 Question)**

SKILL ASSESSMENT (PRACTICAL)

Assessment of skills by the students should be done by the assessors/examiners on the basis of practical demonstration of skills by the candidate, using a competency checklist The competency checklist should be developed as per the National Occupation Standards (NOS's) given in the Qualification Pack for the Job Role to bring about necessary consistency in the quality of assessment across different sectors and Institutions. The student has to demonstrate competency against the performance criteria defined in the National Occupation Standards and the assessment will indicate that they are 'competent', or are 'not yet competent'. The assessors assessing the skills of the students should possess a current experience in the industry and should have undergone an effective training in assessment principles and practices. The Sector Skill Councils should ensure that the assessors are provided with the training on the assessment of competencies. Practical examination allows candidates to demonstrate that they have the knowledge and understanding of performing a task. This will include hands-on practical exam and viva voce. For practical, there should be a team of two evaluators – the subject teacher and the expert from the relevant industry certified

by the Board or concerned Sector Skill Council. The same team of examiners will conduct the viva voce.

Project Work (individual or group project) is a great way to assess the practical skills on ascertain time period or timeline. Project work should be given on the basis of the capability of the individual to perform the tasks or activities involved in the project. Projects should be discussed in the class and the teacher should periodically monitor the progress of the project and provide feedback for improvement and innovation. Field visits should be organized as part of the project work. Field visits can be followed by a small-group work/project work. When the class returns from the field visit, each group might be asked to use the information that they have gathered to prepare presentations or reports of their observations. Project work should be assessed on the basis of practical file or student portfolio.

Student Portfolio is a compilation of documents that supports the candidate's claim of competence.

Documents may include reports, articles, photos of products prepared by students in relation to the unit of competency.

Viva voce allows candidates to demonstrate communication skills and content knowledge. Audio or video recording can be done at the time of viva voce. The number of external examiners would be decided as per the existing norms of the Board and these norms should be suitably adopted/adapted as per the specific requirements of the vocational subject. Viva voce should also be conducted to obtain feedback on the student's experiences and learning during the project work/field visits.

5. UNIT CONTENTS

GRADE-11

PART A: EMPLOYABILITY SKILLS

S. No.	Units	Duration (hrs)
1.	Communication Skills- III	25
2.	Self-management Skills – III	25
3.	Information and Communication Technology Skills - III	20
4.	Entrepreneurial Skills – III	25
5.	Green Skills – III	15
	Total	**110**

UNIT 1: COMMUNICATION SKILLS – III			
Learning Outcome	**Theory (10 hrs)**	**Practical (15 hrs)**	**Duration (25 hrs)**
1. Demonstrate knowledge of communication	1. Introduction to communication 2. Importance of communication 3. Elements of communication 4. Perspectives in communication 5. Effective communication	1. Role-play on the communication process 2. Group exercise on factors affecting perspectives in communication 3. Classroom discussion on the 7Cs of effective communication 4. Chart making on elements of communication	03
2. Demonstrate verbal communication	1. Verbal communication 2. Public Speaking	1. Role-play of a phone conversation. 2. Group exercise on public speaking	02

3. Demonstrate non- verbal communication	1. Importance of non-verbal communication 2. Types of non-verbal communication 3. Visual communication	1. Role-play on non-verbal communication 2. Group exercise on body language 3. Group activity on methods of communication	02
4. Speak using correct pronunciation	1. Pronunciation basics 2. Speaking properly 3. Phonetics 4. Types of sounds	1. Group activities on practicing pronunciation	01
5. Apply an assertive communication style	1. Important communication styles 2. Assertive communication 3. Advantages of assertive communication 4. Practicing assertive communication	1. Group discussion on communication styles 2. Observing and sharing communication styles	03
6. Demonstrate the knowledge of saying no	1. Steps for saying 'No' 2. Connecting words	1. Group discussion on how to respond 2. Group activity on saying 'No'	02
7. Identify and use parts of speech in writing	1. Capitalisation 2. Punctuation 3. Basic parts of speech 4. Supporting parts of speech	1. Group activity on identifying parts of speech 2. Writing a paragraph with punctuation marks 3. Group activity on constructing sentences 4. Group activity on identifying parts of speech	03
8. Write correct sentences and paragraphs	1. Parts of a sentence 2. Types of object 3. Types of sentences 4. Paragraph	1. Activity on writing sentences 2. Activity on active and passive voice 3. Assignment on types of sentences	02

9. Communicate with people	1. Greetings 2. Introducing self and others	1. Role-play on formal and informal greetings 2. Role-play on introducing someone 3. Practice greetings	02
10. Introduce yourself to others and write about oneself	1. Talking about self 2. Filling a form	1. Practice self-introduction and filling up forms 2. Practice self-introduction to others	01
11. Develop questioning skill	1. Main types of questions 2. Forming closed and 3. open-ended questions	1. Practice exercise on forming questions 2. Group activity on Framing questions	01
12. Communicate information about family to others	1. Names of relatives 2. Relations	1. Practice talking about family 2. Role-play on relations	01
13. Describe habits and routines	1. Concept of habits and routines	1. Discuss habits and routines 2. Group activity on describing routines	01
14. Ask or give directions to others	1. Asking for directions 2. Using landmarks	1. Role-play on asking and giving directions 2. Identifying symbols	**01**
Total			**25**

UNIT 2: SELF-MANAGEMENT–III			
Learning Outcome	**Theory (10 hrs)**	**Practical (15 hrs)**	**Duration (25 hrs)**
1. Identify and analyze own strengths and weaknesses	1. Understanding self 2. Techniques for identifying strengths and weaknesses 3. Difference between interests and abilities	1. Activity on writing aims in life 2. Prepare a worksheet on interests and abilities	03

2. Demonstrate personal grooming skills	1. Guidelines for dressing and grooming 2. Preparing a personal grooming checklist	1. Activity on dressing and grooming standards 2. Self-reflection on dressing and grooming	04

3. Maintain personal hygiene	1. Importance of personal hygiene 2. Three steps to personal hygiene 3. Essential steps of hand washing	1. Role-play on personal hygiene 2. Assignment on personal hygiene	03
4. Demonstrate the knowledge of working in a team and participating in group activities	1. Describe the benefits of teamwork 2. Working in a team	1. Assignment on working in a team 2. Self-reflection on teamwork	03
5. Develop networking skills	1. Benefits of networking skills 2. Steps to build networking skills	1. Activity on networking 2. Assignment on networking skills	03
6. Describe the meaning and importance of self-motivation	1. Meaning of self-motivation 2. Types of motivation 3. Steps to building self- motivation	1. Activity on staying motivated 2. Assignment on reasons hindering motivation	03
7. Set goals	1. Meaning of goals purpose of goal-setting 2. Setting SMART goals	1. Assignment on setting SMART goals 2. Activity on developing long-term and short-term goals	03
8. Apply time management strategies and techniques	1. Meaning and importance of time management 2. Steps for effective time management	1. Checklist for making preparation for daily activities 2. Preparing To-do-list	03
Total			**25**

UNIT 3: INFORMATION AND COMMUNICATION TECHNOLOGY-III			
Learning Outcome	**Theory (08 hrs)**	**Practical (12 hrs)**	**Duration (20 hrs)**
1. Create a document on the word processor	1. Introduction to ICT 2. Advantages of using a word processor. 3. Work with Libre Office Writer	1. Demonstration and practice of the following: • Creating a new document • Typing text • Saving the text • Opening and saving file on Microsoft word/Libre Office Writer.	02
2. Identify icons on the toolbar	1. Status bar 2. Menu bar 3. Icons on the Menu bar 4. Multiple ways to perform a function	1. Work with a basic user interface of LibreOffice writer 2. Working with LibreOffice Writer or Microsoft Word	02
3. Save, close, open and print document	1. Save a word document 2. Close Open an existing document 3. Print	1. Perform the functions for saving, closing and printing documents on LibreOffice Writer 2. Perform the Functions on Microsoft Word	02
4. Format text in a word document	1. Change style and size of text 2. Align text 3. Cut, Copy, Paste 4. Find and replace	1. Perform the Functions of Formatting on LibreOffice Writer 2. Perform the Functions of Formatting on Microsoft Word	02

5. Check spelling and grammar in a word document	1. Use of spell checker 2. Autocorrect	1. Perform the Functions of checking spellings on LibreOffice Writer 2. Perform the Functions of Checking the Spelling on Microsoft Word	02
6. Insert lists, tables, pictures, and shapes in a word document	1. Insert bullet list 2. Number list 3. Tables 4. Pictures 5. Shapes	1. Perform the Functions on LibreOffice Writer	03
7. Insert header, footer and page number in a word document	1. Insert header 2. Insert footer 3. Insert page number 4. Page count	1. Perform the Functions on LibreOffice Writer 2. Perform the Functions on Microsoft Word	03
8. Make changes by using the track change option in a word document	1. Tracking option 2. Manage option 3. Compare documents	1. Perform the Functions on LibreOffice Writer 2. Perform the functions on Microsoft Word	04
Total			**20**

UNIT 4: ENTREPRENEURIAL SKILLS – III			
Learning Outcome	**Theory (10 hrs)**	**Practical (15 hrs)**	**Duration (25 hrs)**
1. Differentiate between different kinds of businesses	1. Introduction to entrepreneurship 2. Types of business activities	1. Role-play on different kinds of businesses	03
2. Describe the significance of entrepreneurial values	1. Meaning of value 2. Values of an Entrepreneur 3. Case study on qualities of an entrepreneur	1. Role-play on qualities of an entrepreneur	03

3. Demonstrate the attitudinal changes required to become an entrepreneur	1. Difference between the attitude of entrepreneur and employee	1. Interviewing employees and entrepreneurs	03
4. Develop thinking skills like an entrepreneur	1. Problems of entrepreneurs 2. Problem-solving 3. Ways to think like an entrepreneur	1. Group activity on identifying and solving problems	04
5. Generate business ideas	1. The business cycle 2. Principles of idea creation 3. Generating a business idea 4. Case studies	1. Group activity to create business ideas	04
6. Describe customer needs and the importance of conducting a customer survey	1. Understanding customer needs 2. Conducting a customer survey	1. Conducting a customer survey	04
7. Create a business plan	1. Importance of business planning 2. Preparing a business plan 3. Principles to follow for growing a business 4. Case studies	1. Activity on developing a business plan	04
Total			**25**

UNIT 5: GREEN SKILLS – III			
Learning Outcome	**Theory (07 hrs)**	**Practical (08 hrs)**	**Duration (15 hrs)**
1. Describe the importance of the main sector of the green economy	1. Meaning of ecosystem, food chain and sustainable development 2. Main sectors of the green economy- E-waste management, green transportation, renewal energy, green construction, and water management	1. Discussion on sectors of green economy 2. Preparing posters on various sectors for promoting green economy 3. Writing an essay or a short note on the important initiatives for promoting green economy.	06

2. Describe the main recommendations of policies for the green economy	1. Policies for a green economy	1. Discussion on initiatives for promoting the green economy	03
3. Describe the major green sectors/ areas and the role of various stakeholders in the green economy	1. Stakeholders in the green economy	1. Group discussion on the role of stakeholders in the green economy 2. Preparation of posters on green sectors and their stakeholders 3. Making solar bulbs.	03
4. Identify the role of government and private agencies in the green economy	1. Role of the government in promoting a green economy 2. Role of private agencies in promoting green economy	1. Discussion on the role of Government and Private Agencies in promoting a green economy. 2. Posters on green sectors.	03
Total			**15**

PART B–VOCATIONAL SKILLS – GRADE 11

S.No.	Units	Duration (Hrs.)
1.	Unit 1: Milk Composition and Constituents	35
2.	Unit 2: Sampling of Milk and Milk Products	25
3.	Unit 3: Adulterants, Preservatives and Neutralizers in Milk	35
4.	Unit4: Chemical analysis of Milk and Milk Products	30
5.	Unit 5: Market Milk	40
	Total	**165**

UNIT 1: MILK COMPOSITION AND CONSTITUENTS			
Duration (35 Hrs)			
Learning Outcome	**Theory (15 Hrs)**	**Practical (20 Hrs)**	**Duration (35 Hrs)**
1. Understand India's role as the largest milk producer globally. 2. Identify health trends and major challenges in the dairy sector.	1. Present Status and Future of the Dairy Industry in India I. Health- Conscious Consumption II. Challenges Facing the Indian Dairy Industry	1. Survey consumer preferences for dairy products in your locality or school. 2. Collect and analyze labels of different dairy products for health and nutritional information.	10
1. Understand the scope and importance of value-added dairy products. 2. Describe the future growth opportunities in India's dairy sector.	1. Future Prospects and Growth Potential I. Growth in Value-Added Dairy Products II. Future Prospects of India's Dairy Industry	1. List and classify common value-added dairy products (e.g., cheese, paneer, flavored milk). 2. Prepare a short report or chart on emerging trends and innovations in dairy products.	10
1. Understand the basic composition of milk. 2. Identify the nutritional importance of each constituent in milk. 3. Identify major milk constituents like protein, carbohydrate, fat etc. 4. Understand the physical state of constituent in milk.	1. Milk: Composition and Constituents I. Introduction to Milk and their Composition II. The Gross composition of milk 2. Constituent of Milk I. Physical States of Constituents of milk a. Milk Protein b. Milk Carbohydrate c. Milk Fat etc.	1. Observe and record the physical properties of milk (color, taste, smell, consistency). 2. Perform a simple test to detect milk constituents 3. Perform a simple separation of milk fat using the cream separation method. 4. Observe the curdling of milk to understand the behavior of milk proteins and etc.	15
Total			**35**

UNIT 2: SAMPLING OF MILK AND MILK PRODUCTS Duration (25 Hrs.)			
Learning Outcome	**Theory (15 Hrs.)**	**Practical (10 Hrs.)**	**Duration (25 Hrs)**
1. Understand the correct procedure and precautions for sampling milk and milk products. 2. Recognize the importance of labeling, sealing, and lab involvement in sampling.	1. Precautions During Sampling of Milk And Milk Products a. Sampling b. Involvement of Laboratory in Sampling c. Sealing and Labeling etc.	1. Demonstrate proper method of milk sampling using clean, sterile containers. 2. Practice labeling and sealing of samples as per standard protocol.	10
1. Learn important precautions to maintain sample quality and avoid contamination. 2. Understand the correct methods for sampling different dairy products.	• Sampling of Milk and Milk Products (i) Precautions (ii) Sampling of Dairy Product	1. Practice collecting milk samples using hygienic techniques. 2. Sample various dairy products following standard procedures.	5
1. Understand the methods of preserving milk samples, including chemical preservation. 2. Recognize the importance of platform tests like Clot on Boiling, Alcohol, and MBRT etc for milk quality.	1. Milk Sample Preservation a. Chemical preservation b. Common Practice in Dairy Industry c. Platform tests, Clot on Boiling, Alcohol, and MBRT Tests	1. Demonstrate chemical preservation of a milk sample using preservatives like formalin or boric acid. 2. Perform simple platform tests such as Clot on Boiling, Alcohol, and MBRTetc to assess milk quality.	10

1. Identify common tools used for sampling milk and dairy products. 2. Understand the importance of hygiene practices during sampling to prevent contamination. 3. Learn about modern smart technologies used in dairy sampling as of 2025.	1. Sampling Tools, Hygiene, and Smart Technologies (i) Sampling Tools (ii)Hygiene Practices While Sampling (iii)Smart Technologies Used in 2025	1. Demonstrate the use of sampling tools like sterile containers and ladles. 2. Explore or discuss examples of smart technologies (e.g., automated sampling, sensors) in dairy labs.	10
Total			**25**

UNIT 3: ADULTERANTS, PRESERVATIVES AND NEUTRALIZERS IN MILK			
Duration (35 Hrs.)			
Learning Outcome	**Theory (15 Hrs.)**	**Practical (20 Hrs.)**	**Duration (35 hrs)**
1. Learn about adulterants, preservatives, and neutralizers commonly found in milk. 2. Understand the chemical composition and legal standards regulating milk quality.	1. Understanding Adulteration, Preservation and Neutralization a. introduction to Adulterants, Preservatives and Neutralizer b. Chemical composition and Legal standards	1. Identify common adulterants and preservatives through simple detection tests. 2. Compare milk samples to check compliance with legal quality standards.	8

1. Understand the chemical composition of cream, butter, and condensed milk. 2. Learn the legal quality standards and requirements for these dairy products.	1. Chemical Composition and Legal Standards of Cream, Butter and Concentrated Milk (i) Cream (ii) Butter (iii) Condensed	1. Analyze samples of cream, butter, and condensed milk for fat content and other constituents. 2. Compare the samples against legal standards to assess quality compliance.	7
1. Identify common adulterants like vanaspati and animal fat in ghee. 2. Understand modern methods used for detecting adulteration in ghee.	1. Detection of Adulteration in Ghee a. Detection of Vanaspati and Animal Fat b. Common Adulterants Found in Ghee c. Modern Methods etc	1. Perform simple tests to detect presence of vanaspati and animal fat in ghee samples. 2. Discuss about modern techniques used for ghee adulteration analysis.	10
1. Identify common adulterants found in cheese, ice cream, and other frozen dairy products. 2. Understand the importance of detecting adulteration to ensure product safety and quality.	1. Detection of Adulteration in Cheese, Ice Cream and Frozen Dairy Products 2. Common adulterants in Dairy product	1. List common adulterants such as starch, vegetable fats, or synthetic additives in these products. 2. Perform basic tests or observations to detect possible adulteration in samples.	10
Total			**35**

UNIT 4: CHEMICAL ANALYSIS OF MILK AND MILK PRODUCTS			
Learning Outcome	**Theory (10 Hrs.)**	**Practical (20 Hrs.)**	**Duration (30 Hrs)**
1. Understand the importance of quality assessment in raw milk before processing. 2. Learn different methods of assessing milk quality, including visual, sensory, and sediment tests.	1. Quality Assurance in Milk Processing I. Quality Assessment of Raw Milk a) Visual and sensory tests, Sediment test etc	1. Perform visual and sensory evaluation of raw milk for color, smell, and taste. 2. Conduct the sediment test to check for dirt or foreign particles in milk samples.	10
1. Identify common preservatives and neutralizers used in milk and dairy products. 2. Understand simple methods to detect adulterants, preservatives, and neutralizers.	1. Detection of Preservatives, Neutralizers and Adulterants a. Detection of Common Preservatives b. Detection of Common Preservatives	1. Perform tests to detect common preservatives such as formalin and boric acid in milk. 2. Conduct tests to identify neutralizers and other adulterants in dairy samples.	10
1. Understand the importance of microbiological tests to assess milk quality. 2. Learn about dye reduction tests and microbial enumeration methods used in milk testing.	1. Microbiological Quality of Milk i. Dye reduction Tests a) Methylene blue reduction test b) Resazurin reduction test ii. Microbial Enumeration Methods	1. Perform Methylene Blue and Resazurin reduction tests to assess microbial activity in milk. 2. Practice basic microbial enumeration techniques to estimate bacterial count in milk samples.	10
Total			**30**

UNIT 5: MARKET MILK			
Learning Outcome	**Theory (15 Hrs)**	**Practical (25 Hrs)**	**Duration (40 Hrs)**
1. Understand the historical development of the dairy industry in India. 2. Learn about trends in milk production and consumption in the country.	1. Introduction and history of dairy development in India (i) Milk Production (ii) Milk Consumption	3. Survey local milk consumption patterns and discuss factors influencing demand.	5
1. Understand good practices related to the health of animals and milking personnel. 2. Learn the proper milking process and the importance of a clean environment. 3. Recognize hygiene practices essential during milking to ensure milk quality.	1. Clean Milk Production a. Practices related to animal and milking personnel b. Milking process and environment c. Hygiene Practices during Milking	2. Observe and record hygiene measures followed by milking personnel and care of animals. 3. Demonstrate steps of a clean milking process in a controlled environment or through a video/virtual tour.	5

1. Understand the importance of milk reception and initial quality checks. 2. Learn why chilling and filtration are essential for milk quality.	1. Common Dairy Operations i. Milk Reception ii. Chilling and Storage of Milk iii. Filtration and Clarification etc	1. Observe milk reception and perform basic quality assessment. 2. Demonstrate chilling and filtration of milk samples.	10
1. Understand the importance of fat, solids-not-fat (SNF), total solids (TS), and acidity in milk quality. 3. Learn methods to determine fat content, estimate SNF, and test milk acidity.	1. Chemical Quality of Milk-Fat, SNF, TS and Acidity a) Fat Determination b) SNF Estimation c) Acidity test	1. Perform fat determination using the Gerber method or similar technique. 2. Estimate SNF and total solids using formulas or lactometer readings. 3. Conduct acidity test (titration) to measure milk's acidity level.	10
1. Understand the types and properties of common dairy detergents and sanitizers. 2. Learn cleaning and sanitization protocols like CIP (Clean-In-Place) and SIP (Sterilize-In-Place).	1. Cleaning and sanitization a. Common dairy detergents and their properties b. Dairy Sanitizers and Their Properties c. Cleaning and Sanitization Protocols - CIP AND SIP	1. Identify and describe the use of detergents and sanitizers in dairy cleaning. 2. Observe or demonstrate basic CIP and SIP procedures.	10
Total			**40**

GRADE -12

PART A: EMPLOYABILITY SKILLS

S.No.	Units	Duration (hrs)
1.	Communication Skills- IV	25
2.	Self-management Skills - IV	25
3.	Information and Communication Technology Skills - IV	20
4.	Entrepreneurial Skills - IV	25
5.	Green Skills - IV	15
	Total	**110**

UNIT 1: COMMUNICATION SKILLS - IV			
Learning Outcome	**Theory (10 hrs)**	**Practical (15 hrs)**	**Duration (25 hrs)**
1. Demonstrate active listening skills	1. Active listening - listening skill, stages of active listening 2. Overcoming barriers to active listening	1. Demonstration of the factors affecting active listening 2. Preparing posters of steps for active listening 3. Role-play on negative effects of not listening actively	10
2. Identify the parts of speech	1. Parts of speech – using capitals, punctuation, basic parts of speech, supporting parts of speech	1. Group practice on identifying parts of speech 2. Group practice on constructing sentences	10
3. Write sentences	1. Writing skills to the following: • Simple sentence • Complex sentence • Types of object 2. Types of sentences	1. Group work on writing sentences and paragraphs 2. Practice writing sentences in the active or passive voice	5

	- Active and Passive sentences - Statement/Declarative sentence - Question/Interrogative sentence - Emotion/Reaction or Exclamatory sentence - Order or Imperative sentence 3. Paragraph writing	3. Writing different types of sentences	
Total			**25**

UNIT 2: SELF-MANAGEMENT SKILLS – IV			
Learning Outcome	**Theory (10 hrs)**	**Practical (15 hrs)**	**Duration (25 hrs)**
1. Describe the various factors influencing motivation and positive attitude	1. Motivation and positive attitude 2. Intrinsic and extrinsic motivation 3. Positive attitude – ways to maintain positive attitude 4. Stress and stress management - ways to manage stress	1. Role-play on avoiding stressful situations 2. Activity on self-reflection	10
2. Describe how to become result oriented	1. How to become result oriented? 2. Goal setting – examples of result-oriented goals	1. Pair and share activities on the aim of life	5
3. Describe the importance of self- awareness and the basic personality traits, types and disorders	1. Steps towards self- awareness 2. Personality and basic personality traits 3. Common personality disorders- • Suspicious	1. Group discussion on self-awareness	10

	• Emotional and impulsive • Anxious 4. Steps to overcome personality disorders		
Total			**25**

UNIT 3: INFORMATION AND COMMUNICATION TECHNOLOGY SKILLS - IV			
Learning Outcome	**Theory (06 hrs)**	**Practical (14 hrs)**	**Duration (20 hrs)**
1. Identify the components of a spreadsheet application	1. Introduction to spreadsheet application - types of a spreadsheet, creating a new worksheet, components of a worksheet.	1. Group practice on working with LibreOffice	02
2. Perform basic operations in a spreadsheet	1. Opening workbook and entering data – types of data, steps to enter data, editing and deleting data in a cell 2. Selecting multiple cells 3. Saving the spreadsheet in various formats 4. Closing the spreadsheet 5. Opening the spreadsheet. 6. Printing the spreadsheet.	1. Group practice on working with data on LibreOffice Calc.	03
3. Demonstrate the knowledge of working with data and formatting text	1. Using a spreadsheet for addition – adding value directly, adding by using cell address, using a mouse to select values in a formula, using sum function, copying and moving formula 2. Need to format cell and content 3. Changing text style and font size 4. Align text in a cell 5. Highlight text	1. Demonstration of basic calculations in LibreOffice Calc. 2. Group practice on formatting a spreadsheet in LibreOffice Calc.	02

4. Demonstrate the knowledge of using advanced features in spreadsheet	1. Sorting data 2. Filtering data 3. Protecting spreadsheet with password	1. Group practice on sorting data in LibreOffice Calc	03
5. Make use of the software used for making slide presentations	1. Available software presentation 2. Stapes to start LibreOffice Impress 3. Adding text to a presentation	1. Group practice on working with LibreOffice Impress tools 2. Group practice on creating a presentation in LibreOffice Impress	02
6. Open, close and save slide presentations	1. Open, Close, Save and Print a slide presentation	1. Practice exercises on steps to save, close, open and save a presentation	01
7. Demonstrate the operations related to slides and texts in the presentation	1. Working with slides and text in a presentation- adding slides to a presentation, deleting slides, adding and formatting text, highlighting text, aligning text, changing text colour	1. Group practice on working with font styles and types in LibreOffice Impress	04
8. Demonstrate the use of advanced features in a presentation	1. Advanced features used in a presentation 2. Inserting shapes in the presentation 3. Inserting clipart and images in a presentation 4. Changing slide layout	1. Group practice on working with slides in LibreOffice Impress	03
Total			**20**

UNIT 4: ENTREPRENEURIAL SKILLS-IV			
Learning Outcome	**Theory (10 hrs)**	**Practical (15 hrs)**	**Duration (25 hrs)**
1. Describe the concept of entrepreneurship and the types and roles and functions entrepreneur	1. Entrepreneurship and entrepreneur 2. Characteristics of entrepreneurship 3. Entrepreneurship-art and science 4. Qualities of a successful entrepreneur 5. Types of entrepreneurs 6. Roles and functions of an entrepreneur 7. What motivates an entrepreneur 8. Identifying opportunities and risk-taking 9. Startups	1. Group discussion on the topic "An entrepreneur is not born but created". 2. Quiz on various aspects of entrepreneurship.	10
2. Identify the barriers to entrepreneurship	1. Barriers to entrepreneurshp 2. Environmental barriers 3. No or faulty business plan 4. Personal barriers	1. Fishbowl of fears-group discussion about what we fear about entrepreneurship 2. Facing an Interview.	05
3. Demonstrate the knowledge of entrepreneurial attitude and competencies	1. Entrepreneurial attitude 2. Entrepreneurial competencies 3. Decisiveness, 4. Initiative 5. Interpersonal skills-positive attitude, stress management 6. Perseverance 7. Organisational skills-time management, goal setting, efficiency, managing quality.	1. Group discussion on business ideas 2. Group practice on best out of waste 3. Group discussion on the topic of lets grow together 4. Group practice on a snowball fight. 5. Activity on rating friends and self for entrepreneurial qualities. 6. Playing games, such as "Who am I".	10
Total			**25**

UNIT 5: GREEN SKILLS-IV			
Learning Outcome	**Theory (05 hrs)**	**Practical (10 hrs)**	**Duration (15 hrs)**
1. Identify the benefits of the green jobs	1. Green jobs 2. Benefits of green jobs 3. Green jobs in different sectors: • Agriculture • Transportation • Water conservation • Solar and wind energy • Eco-tourism • Building and construction • Solid waste management • Appropriate technology	1. Group discussion on the importance of green job.	8
2. State the importance of green jobs	1. Importance of green jobs in • Limiting greenhouse gas emissions • Minimizing waste and pollution • Protecting and restoring ecosystems • Adapting to the effects of climate change	1. Preparing posters on green jobs. 2. Activities on tree plantation.	7
Total			**15**

PART B–VOCATIONAL SKILLS- GRADE 12

S.No.	Units	Duration (Hrs)
1.	Unit 1: Traditional Indian Dairy Products	35
2.	Unit 2: Fat-rich Dairy Products	30
3.	Unit 3: Packaging of Dairy Products	30
4.	Unit 4: Condensed and Dried Milk Products	35
5.	Unit 5: Dairy By-products	35
	Total	**165**

UNIT 1: TRADITIONAL INDIAN DAIRY PRODUCTS			
Learning Outcome	**Theory (15 Hrs)**	**Practical (20 Hrs)**	**Duration (35 Hrs)**
1. Understand the status, scope, and challenges faced by traditional milk products in India. 2. Learn the classification and types of traditional dairy products.	1. History And Developments in Traditional Dairy Products a. Status, Scope & Challenges of Traditional Milk Products b. Classification of Traditional Dairy Products	1. List common traditional dairy products and discuss their significance. 2. Classify traditional dairy products based on their processing methods or types.	8
1. Learn the methods of preparation for traditional dairy foods like raita, dahiwada, and raabadi. 2. Understand the cultural and nutritional significance of these foods.	1.Miscellaneous traditional dairy foods (i) Method of preparation a) Gulab Jamun b) Rasgulla c) Sandesh d) Rasmalai e) Peda f) Burfi g) Kalakand h) Rabri i) Raita j) Dahiwada k) Raabadi	1. Prepare simple recipes for raita, dahiwada, and raabadi in the kitchen or as a demonstration. 2. Observe and record the step-by-step process and ingredients used in these traditional dairy foods.	7
1. Understand the microbiological quality of traditional products like khoa, burfi, and peda. 2. Learn about common spoilage microorganisms and control measures to ensure product safety.	1. Microbiological Quality and Safety Aspects of Traditional Dairy Products a. Microbiological Quality of Khoa, Burfi and Peda b. Spoilage of Indigenous Products by Microorganisms, Control Measures	1. Observe or study microbial contamination risks in khoa, burfi, and peda. 2. Discuss or demonstrate methods to control spoilage, such as proper storage and hygiene.	10

1. Understand the role of modern machines, equipment, and starter cultures in dairy processing. 2. Learn about improvements in packaging technology enhancing dairy product quality and shelf life.	1. Present Status and Future of The Dairy Industry In India - Use of Machines and Equipment - Use of Starter Cultures - Improved Packaging etc	1. Identify common machines and equipment used in dairy processing. 2. Observe or discuss the use of starter cultures and modern packaging methods in dairy products.	10
Total			**35**

UNIT 2: FAT-RICH DAIRY PRODUCTS			
Learning Outcome	**Theory (10 Hrs)**	**Practical (20 Hrs)**	**Duration 30 (Hrs)**
1. Understand the role and status of lipids (fats) present in milk. 2. Learn about different types of fat-rich dairy products such as cream, butter, and ghee.	1. Introduction to fat- rich Dairy Products (i) Status of lipids in milk (ii) Types of Fat Rich Dairy Products	1. Identify fat-rich dairy products available locally and their characteristics. 2. Observe or perform simple tests to estimate fat content in milk or dairy samples.	8
1. Understand the legal definition, classification, and standards of cream. 2. Learn about the composition and physico-chemical properties of cream.	1. Processing and Production of Cream (i) Legal Definition (ii) Classification (iii) Composition, Physico-chemical etc of cream	1. Classify different types of cream based on fat content and processing. 2. Analyze cream samples for fat content and physical properties like texture and color.	7

1. Understand the definition and legal standards of butter, including Codex guidelines. 2. Learn the composition and classification of different types of butter.	1. Regulatory Aspects of Butter (i) Definition (ii) Codex Standards of Butter (iii) Composition and Classification of Butter	1. Identify and classify butter samples based on fat content and other standards. 2. Compare butter samples with Codex standards for quality assessment.	8
1. Understand the importance of ghee production and its role in dairy industry. 2. Learn about the chemical composition and different methods used for preparing ghee.	1. Ghee Definition, Standards and Composition (i) Necessity for Production of Ghee (ii) Product Description and Chemical Composition of Ghee (iii) Methods of ghee preparation	1. Describe and compare various methods of ghee preparation (traditional and modern). 2. Analyze ghee samples for quality parameters such as fat content and purity.	7
Total			**30**

UNIT 3: PACKAGING OFDAIRY PRODUCTS			
Learning Outcome	**Theory (15 Hrs)**	**Practical (15 Hrs)**	**Duration (Hrs)**
1. Understand how packaging has evolved to meet the changing needs of society. 2. Learn about the origins of packaging and its transformation during the Industrial Revolution into modern food packaging.	1. Introduction and History of Package Development a. Changes in packaging to meet society's needs b. The origins of packaging c. The Industrial Revolution and Modern Food Packaging	1. Trace the history of packaging materials and methods through samples or visual aids. 2. Discuss how modern packaging improves food safety, shelf life, and convenience.	7

1. Understand the key requirements and functions necessary for creating effective packaging. 2. Learn the criteria for selecting appropriate packaging materials based on product needs.	1. Importance, Functions And Requirements For Producing Successful Package a. Requirements for Producing Successful Package b. Selection of Packaging Materials	1. Identify packaging requirements such as protection, preservation, and convenience for dairy products. 2. Compare different packaging materials (plastic, glass, metal, paper) and their suitability.	8
1. Understand vacuum packaging and Modified Atmosphere Packaging (MAP) and their applications in food preservation. 2. Learn the advantages and disadvantages of these packaging methods, including eco-friendly packaging options.	1. Modern Packaging Techniques a. Vacuum and Modified Atmosphere Packaging (MAP) b. Advantage and disadvantage c. Eco Friendly Packaging	1. Observe or demonstrate vacuum packaging and MAP on dairy products to study shelf-life improvement. 2. Discuss eco-friendly packaging materials and their environmental benefits.	7
1. Understand the major categories and types of aseptic packaging systems used in the dairy industry. 2. Learn the prerequisite conditions and equipment, such as aseptic tanks, required for successful aseptic packaging.	1. Scope of Aseptic Packaging a. Major Categories of Aseptic Packaging Systems b. Pre-Requisite Conditions for Aseptic Packaging c. Aseptic Tank	1. Identify different aseptic packaging systems and their applications. 2. Observe or study the design and function of an aseptic tank in packaging processes.	8
Total			**30**

UNIT 4: CONDENSED AND DRIED MILK PRODUCTS			
Learning Outcome	**Theory (15 Hrs)**	**Practical (20 Hrs)**	**Duration (35 Hrs)**
1. Understand the historical development and current status of condensed milk production in India. 2. Identify various uses and applications of condensed milk in the food industry.	1. History, Status and Scope of Condensed Milks In India (i) History (ii) Status of Condensed Milk in India (iii) Uses of Condensed Milks	1. Prepare and observe the process of making sweetened condensed milk using standard methods. 2. Conduct a sensory evaluation of products made with condensed milk to understand its role in food formulations.	8
1. Learn the importance of raw milk grading and quality parameters for manufacturing condensed milk. 2. Understand the diverse applications of condensed milk in desserts, confectionery, baking, and beverages etc.	1. Grading and Quality of Raw Milk For Condensed Milks (i) Uses Of Condensed Milks (ii) Dessert, Confectionary, Baking, Beverages etc.	1. Perform quality tests on raw milk samples to assess their suitability for condensed milk production. 2. Prepare a simple dessert or beverage using condensed milk to observe its functional and sensory contribution.	7
1. Learn about the history and present status of dried milk production in India. 2. Understand the importance of using good quality milk and the need for pretreatments before drying.	1. Dried Milks: History and Status in India (i) Good Quality Milk and Milk Products (ii)Pretreatments for Concentrated Milks	1. Examine the effect of different pretreatments on milk before drying (e.g., preheating, standardization). 2. Evaluate the quality of dried milk samples based on sensory and physical characteristics.	10

1. Learn about recent innovations and technological advancements in condensed and dried milk products. 2. Understand value addition, emerging trends, and changing consumer preferences in dairy-based products.	1. Recent Innovations And Value Addition In Condensed And Dried Milk Products a. Innovations in Condensed Milk Products b. Innovations in Dried Milk Powder Products c. Value Addition and Applications d. Trends and Consumer Preferences etc	1. Analyze market samples of innovative condensed and dried milk products for labeling, packaging, and value-added features. 2. Develop a concept or prototype for a value-added dairy product using condensed or dried milk.	10
Total			**35**

UNIT 5: DAIRY BY-PRODUCTS			
Learning Outcome	**Theory (08)**	**Practical (12)**	**Duration (35)**
1. Understand the global status, availability, and significance of dairy by-products, especially whey. 2. Learn about the processing methods and various industrial and nutritional applications of whey and its by-products.	1. Global Status, Availability and Utilization of Dairy By-Products (i) Whey and Its By-Products (ii) Processing and Utilization of whey	1. Demonstrate the separation of whey during cheese or paneer production and observe its characteristics. 2. Prepare a simple whey-based beverage or product to study its nutritional and functional properties.	10
1. Understand the physico-chemical properties of skim milk and its role in by-product development.	1. Skim Milk and Its By-Products a. Physico-Chemical Characteristics of Skim Milk	1. Analyze the physico-chemical parameters of skim milk such as pH, acidity, and solids content.	10

2. Learn about the classification, specifications, and industrial uses of casein derived from skim milk.	b. Casein: Classification & Specifications	2. Perform the preparation and classification of casein from skim milk and study its properties.	
1. Understand the chemical composition and physical properties of different types of whey. 2. Gain knowledge of modern whey processing technologies and their role in the utilization of whey.	1. Processing and Utilization of Whey a. Chemical Composition of Different Types of Whey b. Physical Properties c. Modern Whey Processing Technologies etc.	1. Analyze samples of acid and sweet whey to determine their chemical composition and physical characteristics. 2. Visit or simulate a whey processing setup to understand techniques like ultrafiltration, drying, and fermentation.	10
1. Learn about the nutritional value of major dairy by-products such as whey, buttermilk, and skim milk. 2. Understand the economic and environmental benefits of utilizing dairy by-products in the food industry.	1. Nutritional Characteristics of By-Products a. Major Dairy By-products and Their Nutritional Importance b. Economic and Environmental Importance	1. Compare the nutritional composition of different dairy by-products through laboratory analysis or data interpretation. 2. Conduct a case study or group discussion on the economic and environmental impact of by-product utilization in dairy processing.	5
Total			**35**

6. ORGANISATION OF FIELD VISITS

In a year, at least 5 visits to a nearby Dairy Processing Unit/ milk processing units should be organised for the students to expose them to the various routine activities undertaken at a milk processing unit/ industry.

Visits to a nearby Dairy processing industry/unit should facilitate the students to observe for themselves the following:

Location, milk collection area and storage area, weighing room, processing sections, storage chamber, production area, packing chamber, supply counter or room, cleaning and maintenance area, waste disposal area, etc. During the visit, students observe and obtain the following information from the owner or the supervisor of the processing unit/industry:

1. Approaches to manage of dairy processing unit.
2. Identification of categories of dairy and dairy products.
3. Identification of various types of ice cream processing equipment, machinery, tools and utensils used in industry.
4. Maintenance procedure of the production machines and their component.
5. Procedures followed for preparing the raw material to be used for production.
6. Standard practices to be followed for food production.
7. Understand roles and responsibilities of a Dairy Processing Technician.
8. Ways to ensure and implement food safety and personal hygiene at the workplace.
9. Types of packaging material used
10. Types of products prepared
11. Hygiene and safety practices used
12. Quality parameters used for testing of the finished products
13. Total input and output handled annually
14. Manpower engaged
15. Total annual income
16. Profit/Loss (Annual)
17. Any other information

7. LIST OF EQUIPMENT AND MATERIALS

The list given below is suggestive and an exhaustive list should be prepared by the vocational teacher. Only basic tools, equipment and accessories should be procured by the schools so that the routine tasks can be performed by the students regularly for practice and acquiring adequate practical experience.

S. No.	Equipment / Tool	Quantity	Approx. Cost (₹)
A. Basic Handling & Storage			
1	Refrigerator (180–200 L)	1	20,000
2	Deep Freezer (100–200 L)	1	30,000
3	Stainless Steel Utensils (pans, ladles, buckets, molds, trays)	Set	20,000
4	Milk Cans (20–40 L, SS/Aluminium)	2	3,000 each
5	Multipurpose Stainless Steel Vat (50–100 L, for heating, pasteurization, khoa, sweets, etc.)	1	60,000
B. Small-scale Processing Units			
6	Small Pasteurizer (25–50 L, electric)	1	40,000
7	Mini Cream Separator (60–100 L/hr)	1	15,000
8	Small Homogenizer (hand/electric, 50 L/hr)	1	50,000
9	Paneer Press (manual)	1	10,000
10	Butter Churner (table-top, 10–15 L)	1	8,000
11	Ghee Boiler (20 L)	1	15,000
12	Ice Cream Maker (table-top, 5–10 L)	1	30,000
13	Small Incubation Box / Curd Maker (20–30 L)	1	10,000
14	Khoa/Mawa Making Pan (small, 20–25 L)	1	25,000
15	Rasgulla/Rabri Cooking Vessel (SS with gas burner)	1	15,000
C. Packaging & Display			
16	Hand Sealer / Pouch Sealer	1	5,000
17	Cup Sealer (for ice cream/yoghurt cups)	1	15,000
18	Digital Weighing Balance (10 kg)	1	5,000
19	Display Cabinet / Showcase (for chilled products)	1	25,000

D. Testing & Learning Kits			
20	Lactometer	2	2,500 each
21	Gerber Centrifuge (fat testing kit)	1	10,000
22	pH Paper Strips / Small pH Meter	1	5,000
23	School-level Milk Testing Kit (adulteration, fat, SNF)	1	15,000
E. Safety & Miscellaneous			
24	First Aid Kit	1	2,000
25	Aprons, Gloves, Head Caps (for students)	Set	5,000
26	Cleaning Brushes, Racks, SS Tables	–	10,000
Total			**₹ 476,000 ≈ ₹ 4.8 Lakhs**

8.VOCATIONAL TEACHER'S/TRAINER'S QUALIFICATION AND GUIDELINES

Qualification and other requirements for appointment of vocational teachers/trainerson contractual basis should be decided by the State/UT. The suggestive qualifications and minimum competencies for the vocational teacher should be as follows:

Qualification	Minimum Competencies	Age Limit
Bachelors/Post-Graduation in dairy technology/ dairy sciences/food processing/ food technology from a recognized Institute /University, with at least 1 year work experience in industry.	• Effective communication skills (oral and written) • Basic computing Skills	18-37 years (as on Jan. 01 (year)) Age relaxation to be provided as per Govt. rules

9. LIST OF CONTRIBUTORS

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