

Programme Structure of Diploma in Dairy Technology (DDT)

Programme Structure

In order to be eligible for the award of the Diploma, a student has to complete the following eight Courses (integrated with practical) equivalent to 32 credits (1 credit is equal to 30 study hours)

Course Code	Title of the Course	Credits (T+P)
BPVI-011	Milk Production and Quality of Milk	4 Credits
BPVI-012	Dairy Equipment and Utilities	4 Credits
BPVI-013	Milk Processing and Packaging	4 Credits
BPVI-014	Dairy Products - I	4 Credits
BPVI-015	Dairy Products - II	4 Credits
BPVI-016	Dairy Products - III	4 Credits
BPVI-017	Quality Assurance (with Supplementary Material on FSSAI)	4 Credits
BPVI-018	Dairy Management and Entrepreneurship	4 Credits

Unit wise Syllabus of the Programme

1. COURSE 1: BPVI-011 MILK PRODUCTION AND QUALITY OF MILK

S.No.	Block & Unit
Block 1	Dairy Development and Cooperative System
Unit 1	Dairy Development in India
Unit 2	Dairy Cooperatives
Unit 3	Government Policies and Incentives
Block 2	Milk Production
Unit 4	Milch Breeds
Unit 5	Animal Husbandry Practices and Healthcare
Unit 6	Clean Milk Production
Unit 7	Milk Procurement and Modes of Payment
Block 3	Fundamentals of Dairy Chemistry
Unit 8	Milk Composition, its Constituents and Nutritional Importance
Unit 9	Physico-Chemical Properties of Milk
Unit 10	Thermal Processing of Milk
Unit 11	Preservatives, Neutralizers and Adulterants in Milk and their Detection
Block 4	Fundamentals of Dairy Microbiology
Unit 12	Introduction to Microbiology
Unit 13	Milk in Relation to Public Health
Unit 14	Factor Affecting Growth of Micro-Organisms
Unit 15	Control of Microbial Spoilage

PRACTICAL MANUAL

Experiment No.	Name of Experiment (A) Milk Production
Experiment 1	Identification of Different Milch breeds of cattle, Buffaloes, Goats and External Anatomy of Dairy Animals
Experiment 2	Judging of Dairy Animals
Experiment 3	Identification of Various Feeds and Fodders for Dairy Animals
Experiment 4	Preparations of Balanced Rations, Calf Starters, Milk Replacer and Feeding of Calves
Experiment 5	Housing of Animals and Maintenance of Hygienic Conditions at Farm
Experiment 6	Clean Milk Production
Experiment 7	Field/Farm Visits

Experiment No.	Name of Experiment (B) Quality of milk
Experiment 1	Preparation of Standard 0.1N Sodium Hydroxide Solution
Experiment 2	Preparation Of Standard 0.1N Hydrochloric Acid
Experiment 3	Preparation of Gerber Acid for Determination of Fat in Milk

Experiment 4	Sampling of Milk
Experiment 5	Platform test - (i) Clot -On-Boiling Test
Experiment 6	Platform test – (ii) Alcohol Test
Experiment 7	Platform test – (iii) Sediment Test
Experiment 8	Determination of Fat in Milk by Gerber Method
Experiment 9	Determination of Solid-Not-Fat (SNF) in Milk
Experiment 10	Determination of Total Solid (TS) in Milk
Experiment 11	Specific Gravity of Milk
Experiment 12	Determination of Titratable Acidity of Milk
Experiment 13	Determination of Milk pH
Experiment 14	Detection of Starch in Milk
Experiment 15	Detection of Cane Sugar in Milk
Experiment 16	Detection of Glucose in Milk
Experiment 17	Detection of Urea in Milk
Experiment 18	Detection of Ammonium Sulphate in Milk
Experiment 19	Detection of Sodium Carbonate or Bicarbonate as Neutralizer
Experiment 20	Resazurin Reduction Test
Experiment 21	Methylene Blue Reduction (MBR) Test
Experiment 22	Preparation of Microbial Media
Experiment 23	Demonstration of Presumptive Coliform test
Experiment 24	Demonstration of Standard Plate Count Method
Experiment 25	Staining Methods

2. COURSE 2: BPVI - 012 DAIRY EQUIPMENT AND UTILITIES

S.No	Block & Unit
Block 1	Dairy Equipment and their Maintenance
Unit 1	Materials, their Characteristics and Selection of Equipment
Unit 2	Dairy Equipment for Fluid Milk Processing
Unit 3	Dairy Equipment for Milk Products Processing
Unit 4	Preventive Maintenance of Dairy Plant and Machineries
Block 2	Refrigeration System
Unit 5	Basic Principles and Components of Refrigeration System
Unit 6	Different Cooling Systems for Milk and Milk Products
Unit 7	Cold Storage and Insulation
Unit 8	Maintenance and Repair of Commercial Refrigeration System
Block 3	Steam Generation and Boilers

Unit 9	Basic Principles of Steam Generation and Different Types of Boilers
Unit 10	Controls and Safety Devices for Boilers
Unit 11	Steam Supply Line Accessories and Energy Conservation
Unit 12	Instruments for Measuring of Process Parameters
Block 4	Electrical Engineering and Safety Devices
Unit 13	Safety Precautions, Wires and Cables, Function of Fuses and Relays
Unit 14	Single Phase and three Phase Wiring
Unit 15	A.C. Motors, Starters and D.G. set
Unit 16	Sub-station, Transformer, Distribution System and Power Factor
Block 5	Water Supply & Dairy Effluent System
Unit 17	Tube Well, Water Storage and Supply
Unit 18	Water Quality, Water Treatment and Purification
Unit 19	Waste Water Treatment, Reuse and Disposal
Unit 20	Water Conservation and Rain Water Harvesting

PRACTICAL MANUAL

Experiment No.	Name of Experiment
Experiment 1	To Learn Elementary Layout Drawings of Utilities
Experiment 2	Study of Various Workshop Tools
Experiment 3	Study of Different Sanitary S.S. Pipes, Fittings and Gaskets
Experiment 4	Dismantling and Assembling of Milk Pumps
Experiment 5	Study and Sketch the Details of Milk Tanker, Storage Tanks and Silos
Experiment 6	To Study Different Types of Thermometers, Pressure Gauge and Flow Meters
Experiment 7	Study of Refrigeration System: Compressor (Reciprocating), Condensers (shell & tube, atmospheric) and Expansion Devices (Thermostatic) Expansion valve/capillary tube)
Experiment 8	Study of Parts and Operation of a Cold Storage Plant and an Ice Bank Unit
Experiment 9	Study Different Parts and Learn the Operation of Plate Chiller and Bulk Milk Cooler
Experiment 10	Study of Water supply System and Water Softening Plant
Experiment 11	Study the Constructional Details of Fire Tube and Water Tube Boilers
Experiment 12	Study of a Dairy Effluent Plant
Experiment 13	To Study the Different Parts of Single-Phase and Three Phase Induction Motors
Experiment 14	Starting of 3 Phase Squirrel Cage Induction Motors by Direct on Line and Star-Data Starter

Experiment 15	Study of Different Safety Measures to be Adopted in a Dairy Plant
Experiment 16	To Study the Control and Safety Mountings of a Steam Boiler

3. COURSE 3: BPVI-013 MILK PROCESSING AND PACKAGING

S.No	Block & Unit
Block 1	Milk Reception
Unit 1	Milk Collection and Transportation
Unit 2	Milk Reception at the Dairy Dock
Unit 3	Milk Chilling and Storage
Block 2	Processing of Milk
Unit 4	Clarification, Separation, Bactofugation and Standardization
Unit 5	Pasteurization
Unit 6	Homogenization
Unit 7	Sterilization and Ultra-high-temperature Processing
Unit 8	Preparation of Designated and Special Milk
Block 3	Packaging and Distribution
Unit 9	Packaging – Materials, Process and Machinery
Unit 10	Operational Details of Common Packaging Systems for Fluid Milk
Unit 11	Storage and Distribution Systems
Block 4	Cleaning and Sanitization
Unit 12	Types of Detergents and Sanitizers
Unit 13	Methods of Cleaning and Sanitization
Unit 14	Types of Can Washers and their Operational Details
Unit 15	Cleaning-in-place (CIP)

PRACTICAL MANUAL

Experiment No.	Name of Experiment
Experiment 1	Reception of Milk
Experiment 2	Straining, Filtration & Clarification of Milk
Experiment 3	Chilling & Storage of Milk
Experiment 4	Study of Cream Separator
Experiment 5	Study of Separation of Milk
Experiment 6	Standardization of Milk
Experiment 7	Study of Batch Pasteurizer and High Temperature Short Time (HTST) Pasteurizer
Experiment 8	Pasteurization of milk
Experiment 9	Determination of efficiency of pasteurization

Experiment 10	Study of Homogenizer, Homogenization of Milk and Determination of Homogenization efficiency
Experiment 11	Study of Milk Sterilizer, Sterilization of Milk and Determination of Sterilization efficiency
Experiment 12	Study of packaging system of milk
Experiment 13	Preparation of Flavoured Milk, Reconstituted Milk, Toned and Double Toned Milk
Experiment 14	Cleaning of Equipment
Experiment 15	Sanitization of Equipment
Experiment 16	Assessment of Cleaning and Sanitization efficiency

4. COURSE 4: BPVI 014 DAIRY PRODUCTS – I

S.No.	Blocks & Units
Block 1	Cream
Unit 1	Definition, composition, standards and processing of cream
Unit 2	Preparation of different types of cream
Unit 3	Packaging, storage and common defects in cream
Block 2	Butter
Unit 4	Definition, standards and principles of butter making
Unit 5	Methods of manufacture of butter
Unit 6	Packaging, storage and common defects in butter
Block 3	Ghee, butter-oil and fat-rich products
Unit 7	Definition, composition and standards of <i>ghee</i> and butter oil
Unit 8	Principles and methods of manufacture of <i>ghee</i> and butter oil
Unit 9	Packaging, storage, keeping quality extension and adulteration of <i>ghee</i>
Unit 10	Low Fat Spreads

PRACTICAL MANUAL

Experiment No.	Name of Experiment
Experiment 1	Preparation and Standardization of Cream
Experiment 2	Preparation of Sterilized Cream
Experiment 3	Preparation of Butter Starter
Experiment 4	Preparation of Cream for Butter Making
Experiment 5	Construction and Operation of Power Churn
Experiment 6	Construction and Operation of Butter Packaging Machine
Experiment 7	Preparation of <i>Desi</i> Butter (<i>Makkhan</i>), table Butter and Cooking Butter by Hand Operated Churn
Experiment 8	Study of Manufacture of Table Butter by Power Churn.
Experiment 9	Preparation of <i>Ghee</i>
Experiment 10	Agmark Grading of <i>Ghee</i>

Experiment 11	Visit to a small scale Dairy Plant involved in Production of Agmark Grade of Butter and Ghee
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5. COURSE 5: BPVI-015

DAIRY PRODUCTS - II

S.No.	Block & Units
Block 1	Heat Desiccated Products
Unit 1	Definition, composition and standards of <i>khoa</i> , <i>rabri</i> and <i>basundi</i>
Unit 2	Methods of manufacture and factors affecting quality of products
Unit 3	<i>Khoa</i> based sweets
Unit 4	Packaging, shelf life and storage of <i>khoa</i> and <i>khoa</i> based sweets
Block 2	Paneer and Chhana
Unit 5	Definition, composition, standards and factors affecting quality of <i>paneer</i> and <i>chhana</i>
Unit 6	Method of manufacture of <i>Paneer</i> and <i>Chhana</i>
Unit 7	<i>Chhana</i> based sweets
Unit 8	Packaging, storage, common defects, shelf life and preservation of Paneer and Chhana
Block 3	Concentrated Milks
Unit 9	Definition, standards, and nutritive value and principle of evaporation
Unit 10	Methods of manufacture and uses of sweetened condensed and evaporated milks
Unit 11	Packaging, storage and common defects in condensed milks
Block 4	Dried Milks
Unit 12	Definition, composition, classification, standards and principles of drying
Unit 13	Engineering aspects of roller drier, spray drier, fluid bed drier and tray drier
Unit 14	Method of manufacture of spray and roller dried milk powder and value-added products
Unit 15	Packaging, storage quality attributes and common defects of dried milks

PRACTICAL MANUAL

Experiment No.	Name of Experiment
Experiment 1	Preparation of Khoa
Experiment 2	Preparation of Gulabjamun
Experiment 3	Preparation of Peda
Experiment 4	Preparation of Burfi
Experiment 5	Preparation of Rabri
Experiment 6	Preparation of Kalakand and Milk Cake
Experiment 7	Preparation of Kheer
Experiment 8	Preparation of Chhana

Experiment 9	Preparation of Rasogolla
Experiment 10	Preparation of Sandesh
Experiment 11	Preparation of Rasmalai
Experiment 12	Preparation of Channa-Murki
Experiment 13	Preparation of Paneer
Experiment 14	Study of Vacuum Pan/Double Effect/Triple Effect of Evaporator
Experiment 15	Study of Manufacture of Spray Dried Milk Powder
Experiment 16	Preparation of Value Added Products from Dried Milk-Dairy Whitener
Experiment 17	Visit of Dairy Product Manufacturing Plant

6. COURSE 6: BPVI-016

DAIRY PRODUCTS – III

S.No.	Blocks & Units
Block 1	Fermented Products
Unit 1	Starter cultures and nutritional importance of fermented milks
Unit 2	Methods of manufacture of fermented dairy products
Unit 3	Packaging, storage and common defects of fermented milks
Block 2	Cheese
Unit 4	History, definition, composition and classification
Unit 5	Principle and method of manufacture of cheddar cheese
Unit 6	Principle and method of manufacture of mozzarella cheese
Unit 7	Principle and method of manufacture of pasteurized processed cheese products (PCPs)
Block 3	Frozen Dairy Products
Unit 8	Definition, composition, classification and standards
Unit 9	Principle and method of manufacture
Unit 10	Packaging, hardening, storage, transportation and common defects
Unit 11	Softy and novelties – definition, composition, legal standards, method of manufacture
Block 4	By-Products
Unit 12	Skim milk – casein and caseinates
Unit 13	Whey – whey beverages, whey powder, lactose and whey protein concentrates
Unit 14	Buttermilk and ghee residue
Unit 15	New technologies in by-product utilization (membrane processing – reverse osmosis and ultra filtration)

PRACTICAL MANUAL

Experiment No.	Name of Experiment
Experiment 1	Preparation of Starter Culture
Experiment 2	Preparation of <i>Dahi</i>
Experiment 3	Preparation of <i>Mishti Dahi</i>
Experiment 4	Preparation of <i>Lassi</i>
Experiment 5	Preparation of Yoghurt
Experiment 6	Preparation of <i>Shrikhand</i>
Experiment 7	Preparation of Cheddar Cheese from Cow Milk
Experiment 8	Preparation of Mozzarella Cheese
Experiment 9	Preparation of Processed Cheese
Experiment 10	Preparation of Processed Cheese Spread
Experiment 11	Calculation of Ingredients for Ice Cream Mix
Experiment 12	Preparation of Ice-Cream Mix
Experiment 13	Preparation of Ice Cream and Determination of Overrun
Experiment 14	Visit to Ice-Cream Factory
Experiment 15	Visit to Cheese Factory
Experiment 16	Preparation of Softy
Experiment 17	Manufacture of Kulfi
Experiment 18	Manufacture of Casein
Experiment 19	Study of Manufacture of Lactose

7. COURSE 7: BPVI-017

QUALITY ASSURANCE

(with Supplementary Material on FSSAI)

S.No.	Blocks & Units
Block 1	Quality
Unit 1	Quality-Definition and importance
Unit 2	Quality Control Management System
Unit 3	Good Manufacturing Practices, Good Hygienic Practices and HACCP
Unit 4	Laboratory Equipment and Instruments
Block 2	Chemical and Microbiological Analysis of Dairy Products
Unit 5	Rule and regulation governing dairy industry (with Supplementary Material on FSSAI)
Unit 6	Sampling of milk and milk products
Unit 7	Chemical analysis of milk and milk products
Unit 8	Microbiological analysis of milk and milk products
Block 3	Sensory Evaluation
Unit 9	Definition, application of sensory quality parameters and sensory lab requirements

Unit 10	Selection and Training of Sensory Panelists and methods of sensory evaluation
Unit 11	Judging of milk and milk products
Block 4	Packaging materials and other common ingredients
Unit 12	Packaging materials and specifications
Unit 13	Testing of packaging materials
Unit 14	Standards for food ingredients
Unit 15	Testing of common ingredients.

PRACTICAL MANUAL

Experiment No.	Name of Experiment
Experiment 1	Familiarization with laboratory equipment and instruments
Experiment 2	Listing of quality control agencies at national and international level
Experiment 3	Standards specification (chemical and microbiological) of milk and milk products
Experiment 4	Determination of fat in <i>milk, cream, butter, khoa, paneer, Ice cream, milk powder</i>
Experiment 5	Determination of titratable acidity and pH of milk and milk products
Experiment 6	Determination of solubility of milk powder
Experiment 7	Determination of acid value in <i>ghee</i>
Experiment 8	Microbiological analysis of milk products
Experiment 9	Microbiological analysis of air and water.
Experiment 10	Tests for Sanitation of Dairy Equipments (Rinse Solution and Swab Contact Methods)
Experiment 11	Judging Milk
Experiment 12	Judging of Table Butter
Experiment 13	Judging of Ghee
Experiment 14	Judging of Dahi
Experiment 15	Judging of Ice Cream
Experiment 16	Judging of Khoa (Pindi Type)
Experiment 17	Judging of Paneer
Experiment 18	Judging of Cheddar Cheese
Experiment 19	Judging of Milk Powders
Experiment 20	Judging of Shrikhand

8. COURSE 8: BPVI-018

DAIRY MANAGEMENT AND ENTREPRENEURSHIP

S. No.	Blocks/ Units
Block 1	Dairy Plant Management

Unit 1	Milk losses
Unit 2	Managing productivity
Unit 3	Human resources (manpower planning for the dairy/Plant)
Unit 4	Dairy plant design and layout
Block 2	Book-keeping and Accountancy
Unit 5	General principles of book-keeping and accountancy, single and double entry system
Unit 6	Maintenance of accounts and working capital management
Unit 7	Product costing
Block 3	Marketing and Logistics Management
Unit 8	Fundamentals of marketing, understanding consumers, market survey, sale forecasting and assessment
Unit 9	Concept in price and cost analysis
Unit 10	Market information system and logistics planning
Block 4	Entrepreneurship and Organization Building
Unit 11	Entrepreneurial skills and delegation
Unit 12	Development of business plan
Unit 13	Managing and operating a small business
Unit 14	Performance Evaluation of a small enterprise

PRACTICAL MANUAL

Experiment No.	Name of Experiment
Experiment 1	Identification of sources for milk losses during processing of milk and preparation of milk products. Preparation of check list for controlling the losses.
Experiment 2	Identification of parameters for production efficiency
Experiment 3	Study of Working of a Cooperative Society
Experiment 4	Calculation of milk payment based on fat and two axis pricing policy
Experiment 5	Designing of milk Collection route
Experiment 6	Preparation of ledger, trial-balance and balance-sheet of DCS
Experiment 7	Identification of entrepreneurial skills
Experiment 8	Preparation of a Project Report to Set up a Small Dairy Plant
Experiment 9	Assessment of Strengths and Weaknesses of Milk and Milk Product Marketing
Experiment 10	Preparation of check-list of Problems in Procurement and Distribution of Milk.
Experiment 11	Study of Storekeeping Practices, Inventory Control and Maintenance of Various Records
Experiment 12	Preparation of check-list for evaluation of performance of a dairy plant
Experiment 13	Steam Load Estimation of a Dairy Plant
Experiment 14	Refrigeration Load Estimation of Dairy Plant
Experiment 15	Electrical Load Estimation of Dairy Plant