Savitribai Phule Pune University

Anekant Education Society's

TULJARAM CHATURCHAND COLLEGE, BARAMATI, DIST-PUNE – 413102

Syllabus

For

B. Voc.

(Dairy Technology)

S. Y. Semester IV (2022 Pattern)

Sponsored by

University Grant Commission

Under

National Skill Qualification Framework (NSQF)

To be implemented from

2023-24

Title of the Course: B. Voc. (Dairy Technology)

(To be implemented from Academic Year –2023-24)

Course structure:

- B.Voc. is three-year course with three theory and three practical courses in each semester**.**
- Each theory course will be of four credits and each credit is of 15 periods
- Each practical course will be of six credits and each credit is of 15 periods
- Each period is of one clock hour.
- In each practical course there will be one visit to the relevant industry/ institute.
- In addition to the regular practicals based on the theory course, special emphasis will be on communications and soft skills development of the students.

Eligibility:

1) **First Year B.Voc. (Diploma):** A student who has passed the Higher Secondary School Certificate (10+2) in any stream or its equivalent examination
2) **Second Year B.Voc. (Advanced diploma):** Keeping terms of First Year of B. Voc. and if they fulfil the eligibility conditions.
3) **Third Year B.Voc. (Degree):** Student shall pass all First Year B. Voc. courses and satisfactorily keeping terms of Second Year of B. Voc.

Note: Admissions will be given as per the selection procedure / policies adopted by the college, in accordance with conditions laid down by the Savitribai Phule Pune University, Pune.

Examination Pattern:

Examination:

- **Pattern of Examination**

  i) Internal exam, Term end exam, Oral, Project, Presentation, GD, Viva voce

  ii.) Pattern of the question paper:

  i) 25% Objective Question

  II) 50% Short and Long Answer type question

  iii) 25% Problem based Case Study/long answer type

- **Theory Examination: -**

  i) Continuous Internal Assessment: 50 Marks (Unit Test I & II, Assignment-2 No., Attendance) for each course of programme.

  ii) Semester End Examination: 50 Marks on the basis of Answer Sheet Evaluation for each course

- **Practical Examination: -**

  i) Continuous Internal Assessment: 75 Marks (Visit Report, Journal, Viva Voce, Seminar/Presentation, Group Discussion and Attendance) for each course.

ii) Semester End Examination: 75 Marks on the basis of Answer Sheet Evaluation with performance in practical examination which will be evaluated by external examiner for each course.

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TULJARAM CHATURCHAND COLLEGE, BARAMATI, DIST-Pune-413102
Dairy Technology(B. Voc. Programme)

Sub. Code	**Semester-I**	**Credits**	**Marks**
	Theory (General Education Component)		
UBDT-111	Dairy Development	04	100
UBDT-112	Dairy Farm Management	04	100
UBDT-113	Dairy Chemistry	04	100
	Practical(Skill component)		
UBDT-111-1	Dairy Farm Management	06	150
UBDT-111-2	Dairy Chemistry	06	150
UBDT-111-3	Soft Skill Development	06	150
	Total	**30**	**750**
	Semester-II		
	Theory (General Education Component)		
UBDT-121	Food Technology	04	100
UBDT-122	Market Milk	04	100
UBDT-123	Microbiology of Milk and Milk Products	04	100
	Practical(Skill component)		
UBDT-121-1	Food Technology	06	150
UBDT-121-2	Microbiology of Milk and Milk Products	06	150
UBDT-121-3	Computer Skills	06	150
	Total	**30**	**750**
	Total First Year	**60**	**1500**
Sub. Code	**Semester-III**	**Credits**	**Marks**
	Theory (General Education Component)		
UBDT-231	Dairy Processing Equipment	04	100
UBDT-232	Fermented Milk Products	04	100
UBDT-233	Nutrition Science	04	100
	Practical		
UBDT-231-1	Dairy Processing Equipment	06	150
UBDT-231-2	Fermented Milk Products	06	150
UBDT-231-3	Nutrition Science	06	150
	Total	**30**	**750**
	Semester-IV		
UBDT- 241	Dairy Engineering	04	150
UBDT-242	Traditional Indian Dairy Products	04	150
UBDT-243	Food Safety, Hygiene & Sanitation	04	150
	Practical (Skill Based Component)		
UBDT-241-1	Dairy Engineering	06	150

UBDT-241-2	Traditional Indian Dairy Products	06	150
UBDT-241-3	Food Safety, Hygiene & Sanitation	06	150
	Total	**30**	**750**
	Total Second Year	**60**	**1500**
Sub. Code.	**Semester-V**	**Credits**	**Marks**
	Theory (General Education Component)		
BDT-501	Quality Assurance and Waste management	04	100
BDT-502	Fat Rich Milk Products	04	100
BDT-503	Dairy Plant Management	04	100
	Practical (Skill Based Component)		
BDT-5.1	Quality Assurance and Waste management	06	150
BDT-5.2	Fat Rich Milk Products	06	150
BDT-5.3	Project	06	150
	Total	**30**	**750**
	Semester-6		
BDT-601	Dairy Product Development	04	100
BDT-602	Packaging Technology	04	100
BDT-603	Entrepreneurship Development	04	100
	Practical (Skill Based Component)		
BDT-6.1	Dairy Product Development	06	150
BDT-6.2	Packaging Technology	06	150
BDT-6.3	In-Plant Training	06	150
	Total	**30**	**750**
	Total Final Year	**60**	**1500**
	Total for three years	**180**	**4500**

Note:

- One compulsory visit to field/industry/institute for each practical papers in all semesters
- Report Submission and PPT presentation of visit report is mandatory
- Seminar Report preparation and PPT presentation mandatory for each theory papers.
- Group discussion/case study based on local/regional/national social economic aspects.

- **B. Voc. Second Year** **Paper No. UBDT - 241** **Semester IV**

Dairy Engineering (Theory-General Education)

Maximum Marks: 100 **Credits: 4**
Teaching Period: 4/Week **Teaching Load: 60 Theory Period/Semester**

Objectives-

- To study the different utilities used in dairy plant
- To study refrigeration unit, its working, and principle
- To study Heat transfer in dairy plant
- To study water supply and it's utilization in a dairy plant
- To study treatments of wastewater and effluent.

Course Outcome:

- Students will get an exposure towards engineering aspect of a dairy industry.
- Students will be able to define AC, Refrigeration cycle, Refrigerant.
- They will know the importance, process and equipments of Heat transfer.
- They will acquire information on nature, sources and treatments of water supply of a dairy industry.
- They will be able to demonstrate utilization of different dairy equipment.

Unit-1Refrigeration:Principles of Vapor compression refrigeration cycle, refrigeration components, common refrigerants, properties of good refrigerants, Ice bank Tank (IBT), Bulk milk cooler **12 Periods**

Unit-2Basic electrical engineering: Alternating current fundamentals, Polyphase alternating current circuits, star & delta connections. AC Motors, starters & DG set, Fundamentals of Transformer **12 Periods**

Unit-3 Heat transfer: Heat transfer Principle and Laws, Types of heat exchangers, their installation & working, Microwave heating of milk and milk products, Evaporators and dryers, Humidifiers **12 Periods**

Unit-4 Equipments and Milk storage: Butter churners – Types, Installation, working & Maintenance, Ice-Cream freezers-Types & working, Ghee Vat, Cheese Vat, Paneer Equipments, Milk storage tanks and milk silos, Packaging equipments of milk/ dairy products and processing units of UHT plant **12 Periods**

Unit-5 Water Supply and Dairy Effluent System: Tube well, water storage and supply, Water quality water treatments and purification, Waste water treatment, reuse and disposal, Water conservation and rain water harvesting **12 Periods**

References:

1. Refrigeration and Air conditioning(1993) Arrora S.C. Domkundwar S.
2. Engineering Thermodynamics (1977) Gupta C.P, Prakash Rajendra
3. Food Engineering systems (1979) Farrall Arthur W.

B. Voc. Second Year **Paper No. UBDT-242** **Semester IV**

Traditional Indian Dairy Products (Theory-General Education)

Maximum Marks: 100 **Credits: 4**

Teaching Period: 4/Week **Teaching Load: 60 Theory Period**

Objectives-

- To study various categories of milk products.
- To know importance of indigenous milk product and its market demand.
- To learn the making process of different indigenous milk products.
- To study composition and varieties of Indian dairy products.
- To study the defects to the products and prevention.

Course Outcome:

- Students will get an exposure towards traditional Indian dairy products.
- Students will be able to define categories of milk products.
- They will know the importance of traditional Indian dairy products.
- They will acquire information on product manufacturing and its nutritional value.
- They will be able to understand market value of traditional Indian dairy products

Unit 1- Introduction to categories of dairy products

Definition, Composition, and standards of Khoa and Basundi, Methods of manufacture and factors affecting quality of Khoa based sweets **12 Periods**

Unit 2- Heat and Acid Coagulated products

Definition, Composition, Standards and Factors affecting quality, Methods of manufacturing of Paneer and Chhana, Chhana based sweets **12 Periods**

Unit 3- Concentrated Milks

Definition, standards and nutritive value and principle of evaporation, methods of manufacture and use of sweetened condensed and evaporated milks**12 Periods**

Unit 4 Fat Rich Products

Ghee, Butter Definition, Composition and standards, Methods of manufacturing **12 Periods**

Unit 5 Judging and Grading of indigenous milk products

Procedure for examination, Requirements for high grade products, any indigenous products, defects and their causes and prevention **12 Periods**

References:

1. Milk Products of India – ICAR Anantkrishanan C.P. and Srinivasan M.R.
2. Technology of Indian Milk Products- Aneja R.P., Mathur B.N.
3. Indian Dairy Products (1974) Rangappa K.S., Acharya K.T.

B. Voc. First Year **Paper No. UBDT-243** **Semester IV**

Food Safety, Hygiene and Sanitation (Theory-General Education)

Maximum Marks: 100 **Credits: 4**

Teaching Period: 4/Week **Teaching Load: 60 Theory Period/Semester**

Objectives: To understand the following:

- Food safety, hygiene and sanitation
- Industrial waste utilization
- Design and implementation of food safety management systems
- Structure and implementation of ISO series, FSSAI
- HACCP and its prerequisites such as GMP, GHP etc.

Course Outcome:

- Students will get an exposure towards Food safety, hygiene and sanitation.
- Students will be able to define Industrial waste utilization.
- They will know Design and implementation of food safety management systems.
- They will know about Structure and implementation of ISO series, FSSAI.
- They will comprehend HACCP and its prerequisites such as GMP, GHP etc

Unit-1: Introduction to Food Safety: Definition, Types of hazards, biological, chemical, physical hazards, Factors affecting Food Safety, Importance of Safe Foods **12 Periods**

Unit-2: Food Safety Management Tools: Basic concept, Prerequisites- GHPs ,GMPs, SOPs etc, HACCP, ISO series, FSSAI, TQM - concept and need for quality, components of TQM, Kaizen. Risk Analysis, Accreditation and Auditing **12 Periods**

Unit-3:Industrial byproducts and waste utilization: Potential & prospects of byproduct & waste utilization from the food Industries in India Byproduct & waste with special reference to milk & milk products **12 Periods**

Unit-4:Hygiene and Sanitation in Food Service Establishments: Introduction, Sources of contamination, Control methods using physical and chemical agents, Waste Disposal, Pest and Rodent Control, Personnel Hygiene, Food Safety Measures **12 Periods**

Unit-5: Recent concerns: New and Emerging Pathogens, Packaging, Product labeling and Nutritional labeling, genetically modified foods\Transgenic, Organic foods, Newer approaches to food safety, Recent Outbreaks. **12 Periods**

References:

1. Lawley, R., Curtis L. and Davis, J. The Food Safety Hazard Guidebook , RSC publishing, 2004
2. De Vries. Food Safety and Toxicity, CRC, New York, 1997
3. Marriott, Norman G. Principles of Food Sanitation, AVI, New York, 1985
4. Forsythe, S J. Microbiology of Safe Food, Blackwell Science, Oxford, 2000 &Sons; USA, 1987
5. Quality Control for Food Industry – Krammer

B. Voc. Second Year **Paper No. UBDT-241 - 1** **Semester IV**

Dairy Engineering(Practical-Skill Component)

Maximum Marks: 150 **Credits: 6**

Teaching Period: 2/Week **Teaching Load: 24 practical/Semester (4 Period Each)**

Objectives-

- To study the home refrigerator and refrigeration cycle.
- To study milk storage units, water softening
- To study safety measures to be adopted in a dairy plant.
- To study various workshop tools and their utilization.
- To study elementary layout of a dairy plant.

Course Outcome:

- Students will get an exposure towards Refrigeration in dairy plant.
- Students will be able to define different milk storage units.
- They will know the implementation of safety measures in dairy plant.
- They will acquire information on various workshop tools and their utilization
- They will be able to draw elementary layout of a dairy plant.

1. Study of home refrigerator 3P
2. Study and identification of milk storage units 3P
3. Study of Parts and operations of a cold storage plant and ice bank unit 3P
4. Study the different parts and learn the operations of the plate chillers and bulk milk coolers 3P
5. Study of water supply system and water softening plant 3P
6. Study of different safety measures to be adopted in a dairy plant 3P
7. Study of various workshop tools 3P
8. Study elementary layout, drawings of utilities 3P

B. Voc. Second Year **Paper No. UBDT-241 - 2** **Semester IV**

Traditional Indian Dairy Products (Practical-Skill Component)

Maximum Marks: 150 **Credits: 4**

Teaching Period: 2/Week **Teaching Load: 24 Practical/Semester (4 Period Each)**

Objectives-

- To study various categories of milk products.
- To know importance of indigenous milk product and its market demand.
- To learn the making process of different indigenous milk products.
- To study composition and varieties of Indian dairy products.
- To study the defects to the products and prevention.

Course Outcome:

- Students will get an exposure towards traditional Indian dairy products.
- Students will be able to define categories of milk products.
- They will know the importance of traditional Indian dairy products.
- They will acquire information on product manufacturing and its nutritional value.
- They will be able to understand market value of traditional Indian dairy products

1. Preparation of Khoa 1P
2. Preparation ofPedha 2P
3. Preparation of Burfi 2P
4. Preparation of Gulabjamun 3P
5. Preparation of Chhana 3P
6. Preparation of Roshogulla 2P
7. Preparation of Rasmalai 3P
8. Preparation of Paneer 2P
9. Preparation of Kheer 3P
10. Preparation of Paneer 3P

B. Voc. First Year **Paper No. UBDT- 241 - 3** **Semester IV**

Food Safety, Hygiene and Sanitation (Practical-Skill Component)

Maximum Marks: 150 **Credits: 6**

Teaching Period: 2/Week **Teaching Load: 24 Practical/Semester(4Period Each)**

Objectives: To understand the following:

- Food safety, hygiene and sanitation
- Industrial waste utilization
- Design and implementation of food safety management systems
- Structure and implementation of ISO series, FSSAI
- HACCP and its prerequisites such as GMP, GHP etc.

Course Outcome:

- Students will get an exposure towards Food safety, hygiene and sanitation.
- Students will be able to define Industrial waste utilization.
- They will know Design and implementation of food safety management systems.
- They will know about Structure and implementation of ISO series, FSSAI.
- They will comprehend HACCP and its prerequisites such as GMP, GHP etc

1. Preparation of inspection schedule and inspection charts. 4P
2. Study of CIP system 4P
3. Preparation of detergent & sanitizer solutions of desired strength. 4P
4. Test for sanitization of dairy equipment (Swab method) 4P
5. Contamination Control methods using physical and chemical agents 4P
6. Study Identification of CCP 2P
7. Study Personnel Hygiene habits 2P