Savitribai Phule Pune University

Anekant Education Society's

TULJARAM CHATURCHAND COLLEGE, BARAMATI, DIST-PUNE – 413102

Syllabus

For

B. Voc.

(Dairy Technology)

Sponsored by

University Grant Commission

Under

National Skill Qualification Framework (NSQF)

To be implemented from

2022-23

Title of the Course: B. Voc. (Dairy Technology)
(To be implemented from Academic Year - 2022-2023)

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)		
BDT-301	Dairy Processing Equipments	04	100
BDT-302	Fermented Milk Products	04	100
BDT-303	Nutrition Science	04	100
	Practical		
BDT-3.1	Dairy Processing Equipments	06	150
BDT-3.2	Fermented Milk Products	06	150
BDT-3.3	Nutrition Science	06	150
	Total	**30**	**750**
	Semester-IV		
BDT-401	Dairy Engineering	04	150
BDT-402	Traditional Indian Dairy Products	04	150
BDT-403	Food Safety, Hygiene & Sanitation	04	150
	Practical (Skill Based Component)		
BDT-4.1	Dairy Engineering	06	150

BDT-4.2	Traditional Indian Dairy Products	06	150
BDT-4.3	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. First Year **Paper No. UBDT-121** **Semester II**

Food Technology (Theory-General Education)

Maximum Marks: 100 **Credits: 4**

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

Objectives:

- To study methods of preservation of foods
- To study the natural and chemical preservatives i.e. Class I and Class II Preservatives
- To study the preservation of food by high & low temperatures

Course outcome:

1. Students will gather information on preservation of food.
2. They will understand about different processes of food preservation.
3. They will be able to demonstrate pre-preparation actions.
4. They will be able to choose suitable preservation technique.
5. They will be able to improve the shelf life of the food

Unit-1: Introduction to preservation: Definition, Introduction to preservation, History of preservation, general principles of food preservation, Need & benefits of industrial food preservation **12 Periods**

Unit-2: Food Preservation by drying: Types of drying, changes during drying, effect of drying on food, advantaged and disadvantages of drying **12 Periods**

Unit-3: Food preservation by High & Low temperature: Preservation by high temperature: Blanching, pasteurization & Canning, Effect of heat on food and micro-organisms Preservation by low temperature: Chilling, Refrigeration & freezing Effect of low temperature on food & microorganisms **12 Periods**

Unit-4: Food preservation by irradiation: Introduction & units of irradiation, mechanism of action of radiation, radiation process, effect of radiation on food, effect of radiation on micro-organisms **12 Periods**

Unit-5: Food preservation by other methods: Definition of preservative, Types of preservatives - Class I & Class II, Carbonation, Antibiotics, Fermentation & Filtration **12 Periods**

References:

- Handbook of Food preservation (1999) M. Shafiur Rahman CRC Press
- Food Preservation techniques (2003) Peter Zeuthen
- The Technology of Food preservation 4th Edition (2006) Norman W. Desroier

B. Voc. First Year **Paper No. UBDT-122** **Semester II**

Market Milk (Theory-General Education)

Maximum Marks: 100 **Credits: 4**

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

Objectives-

- To study the methods of the collection and transportation of milk.

- To study hygiene and sanitation in dairy industry.
- To know the processing and packaging materials and machineries for milk and milk products.

Course outcome:

1. Students will get acquainted with the different milk processes.
2. They will learn about different types of milk.
3. They will learn about reception & storage of milk.
4. They will acquire information on fundamentals of milk processing.
5. They will be able to solve processing related errors.
6. They will learn about different methods of pasteurizing milk.

Unit-1: Milk Reception: Milk Collection and Transportation, Milk Reception at the Dairy Dock, Milk Chilling and Storage **12 Periods**

Unit-2: Processing of milk: Collection, Storage, Filtration/ Clarification, Pasteurization, Separation, Standardization, Bactofugation, Sterilization **12 Periods**

Unit-3: Sterilization and Ultra-High-Temperature Processing
Definition, Theoretical basis types of sterilization plants, Description of the canning process, Quality of sterilized milk **12 Periods**

Unit-4: UHT
Ultra-High temperature processing definition, Theoretical basis for UHT processing, Types of UHT sterilization plants, Changes in milk during processing, Aseptic packaging, types of sterilizing medium, Types of packaging materials, Description of aseptic packaging systems **12 Periods**

Unit-5: Special Milks: Sterilized milk, Homogenized milk, Flavored milk, Toned milk, Double toned milk, Standardized milk, rehydrated milk, recombinant milk, UHT milk. **12 Periods**

References:

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

B. Voc. Second Year **Paper No. UBDT-123** **Semester II**

Microbiology of Milk and Milk Products (Theory-General Education)

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

Objectives-

- To Know the important genera of microorganisms associated with dairy and their characteristics

- To study the role of microbes in fermentation, spoilage and food borne diseases.
- To study the microbial spoilage of food

Course outcome:

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

Unit 1:History & scope of Microbiology: Introduction to microbiology, Historical Contribution of various scientists, scope of microbiology in food, Types of cell – Prokaryotic & Eukaryotic cell, Introduction to various types of micro-organisms, Structure of bacteria **12 Periods**

Unit 2:Microbial growth in food: Factors affecting growth of micro-organisms, Growth curve, Sources of contamination, causes of spoilage, Food in relation to disease- food borne poisoning, infections and intoxications **12 Periods**

Unit-3:Culture media and Pure culture Techniques: Culture Media & its Composition, Types of culture media Methods for isolation of pure culture- Streak plate, Pour plate and Spread plate **12 Periods**

Unit 4:Microscopy and Staining Procedures: Introduction & types of microscope, Definition of dye & stains, classification of stains- Acidic, Basic and Neutral, principles, procedure, mechanism & applications of staining procedures: simple staining, negative staining, differential staining- gram staining & acid fast staining **12 Periods**

Unit-5:Beneficial microorganisms and Microbial spoilage: Beneficial microorganisms and Microbial spoilage of meat, poultry fish; fruits & vegetables; cereal & cereal products and milk & milk products. **12 Periods**

References:

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

B. Voc. Second Year **Paper No. UBDT-121-1** **Semester II**

Food Technology (Practical-Skill Component)

Maximum Marks: 150 **Credits: 6**

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

Objectives-

- To study methods of preservation of foods

- To study the natural and chemical preservatives i. e. class I and class II preservatives

Course outcome:

- Students will be able to apply different preservation techniques to the food.
- They will understand the processing of food through various processes.
- They will learn about effect of different physical parameters on food.
- They will learn about the variety of preservatives that are used commercially.
- They will be able to improve quality of food.

1. Study of class I and class II preservatives **2P**
2. Preservation of vegetables by Salt (Pickle) **2P**
3. Preservation of Guava by Sugar (Jam) **2P**
4. Preservation of Vegetables by Oil (Pickle) **2P**
5. Preservation of fruits by Chemical preservative (Squash) **3P**
6. Preservation of Fruits and Vegetables by Low temperature (Refrigeration, Freezing) **3P**
7. Preservation of Fruits and Vegetables by High temperature (Blanching, Pasteurization) Vegetables, Fruits, Milk **2P**
8. Preservation of Fruits and vegetables by Drying (Sun and mechanical) **2P**
9. Preservation of Tomatoes by use of acidulants (Ketchup) **2P**
10. Preservation of Indian gooseberry by Osmotic dehydration **4P**
11. Activity – Which are preservatives used in food and prepare the list and write the uses

B. Voc. Second Year **Paper No. UBDT-121-2** **Semester II**

Microbiology of Milk and Milk Products (Practical-Skill Component)

Maximum Marks: 150 **Credits: 6**

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

Objectives-

- To know basic microbiology laboratory practices and equipment
- To study the preparation of media, culture, identify micro organisms
- To study the morphological characteristics of microorganisms

Course outcome:

1. Students will learn about microbiology in milk
2. They will understand the microorganisms of commercial importance & its use for industrial production .
3. They will get acquainted with the different methods of microbial analysis & microbial sampling
4. They will know the overall effect of microbial action on milk as well as effect on environmental factors on microbial growth.
5. They will know the types of organisms, beneficial & harmful microorganisms.

1. Introduction to basic microbiology laboratory practices **2P**
2. Study of compound microscope **2P**
3. Study of instruments used in microbiology lab **2P**
4. Cleaning and methods of sterilization **2P**
5. Microbiological media preparations (Sabourds, Mac-Conkeys, Nutrient, Blood, Chocolate) **3P**
6. Gram staining **1P**
7. Monochrome staining **1P**
8. Cultivation and sub-culturing of microbes **2P**
9. Microbial sampling **1P**
10. Standard Plate Count method **2P**
11. Isolation of E. coli from food sample **2P**
12. Colony characterization **2P**
13. Industrial quality control lab visit **2P**
14. Activities – Study of swab test
15. Study the difference between fresh and spoiled food

B. Voc. First Year **Paper No. UBDT-121-3** **Semester II**

Computer Skills (Practical-Skill Component)

Maximum Marks: 150 **Credits: 6**

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

Objectives-

- To study the computer machine and operating system
- To study the different programmes for development of websites and designing of packaging labels.
- To study different elements of Ms- Office for representation of data.
- To be able to facilitate complicated operations.
- To incorporate technology.

Course outcome:

1. Students will get exposed to various aspects of Information technology.
2. They will learn about different applications of storing the data.
3. They will be able to demonstrate different programmes.
4. They will get acquainted with electronic communication.
5. They will get complete knowledge of accessing MS excel.

1. Introducing Computer and Operating system **1P**
2. MS-WORD **2P**
3. MS-EXCEL **2P**
4. MS-POWERPOINT **2P**

5. Introduction to the internet, search engine **2P**
6. E-Mails, Google Docs and Forms **3P**
7. Introduction to PageMaker **3P**
8. Introduction to Corel Draw **3P**
9. Introduction to Photoshop **2P**
10. Web development: HTML and Scripting language **2P**
11. How to search research papers **1P**
12. How to convert word to PDF and vice-versa **1P**
13. Activity – Report preparation

References*:*

1) Microsoft Office 2000 by Vipra Computers, Vipraprinterspvt. Ltd.
2) Advanced Maicrosoft Office 2000 by MeredithaFlynin, Nita Rukosky, BPB pub.
3) Teach yourself Windows
4) Fundaments of Computers - V. Rajaraman
5) Computer Fundamentals by P. K. Sinha &Priti Sinha, 4th edition, BPB, publication.