

**SAVITRIBAI PHULE PUNE UNIVERSITY PUNE
REVISED SYLLABUS SINCE, JUNE 2018**

BACHELOR OF VOCATION (B. VOC)

SUBJECT-FOOD PROCESSING (DAIRY MILK)

**SCHEME FOR PROVIDING SKILL BASED EDUCATION UNDER NATIONAL SKILL
QUALIFICATION FRAMEWORK (NSQF)**

SPONCERED BY UGC, NEW DELHI

Collaboration with

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B.VOC. SYLLABUS

OBJECTIVES

- **Objectives of Dairy Milk Processing:**

1. Increase production of milk to ensure the availability of recommended minimum dietary requirement.
2. Increase rural development opportunities through entrepreneurship.
3. Enable the sector to comply with Food Safety and Standard Act 2006.
4. Strengthening of organized Dairy Farm Sectors.
5. Value addition and improved marketing to provide better price to the farmers.
6. Innovation, research and development for the cost effective production.
7. Provide better service at farmer's door step.

- **Objectives of Food Processing Technology:**

1. To boost the shelf life of food articles.
2. To prevent contamination of food.
3. For transport and food storage.
4. To turn food products into the ones that appeal to customers.
5. To make availability of food even at distant or remote places.
6. To retain the nutritive value of food.
7. To ensures the availability of food throughout the year

T.Y. B. VOC, FOOD PROCESSING (DAIRY MILK)

29	V	XXIX	FPT 29	TRADITIONAL DAIRY PRODUCTS-I (THEORY)	03
30	V	XXX	FPP 30	TRADITIONAL DAIRY PRODUCTS-I (PRACTICAL)	06
31	V	XXXI	FPT 31	DAIRY TECHNOLOGY (THEORY)	03
32	V	XXXII	FPT 32	FOOD PROCESSING AND PRESERVATION TECHNOLOGY (THEORY)	03
33	V	XXXIII	FPP 33	FOOD PROCESSING AND PRESERVATION TECHNOLOGY (PRACTICAL)	06
34	V	XXXIV	FPT 34	FRUITS AND VEGETABLE PROCESSING TECHNOLOGY (THEORY)	03
35	V	XXXV	FPP 35	FRUITS AND VEGETABLE PROCESSING TECHNOLOGY (PRACTICAL)	06
36	VI	XXXVI	FPT 36	NEW PRODUCT DEVELOPMENT(THEORY)	03
37	VI	XXXVII	PPP 37	PROJECT (PRACTICAL)	06
38	VI	XXXVIII	FPT 38	FARM ANIMALS BREEDING (THEORY)	03
39	VI	XXXIX	FPT 39	FOOD TRENDS AND PROGRAMME (THEORY)	03
40	VI	XXXX	FPP 40	FOOD TRENDS AND PROGRAMME (PRACTICAL)	06
41	VI	XXXXI	FPT 41	ICE-CREAM & FAT RICH DAIRY PRODUCTS (THEORY)	03
42	VI	XXXXII	FPP 42	ICE-CREAM & FAT RICH DAIRY PRODUCTS (PRACTICAL)	06
43				TOTAL CREDITS	180

COURSE:- FOOD PROCESSING (DAIRY MILK)

SEMESTER -V PAPER – XXIX FPT 29

Traditional Dairy Products-I (THEORY)

Marks 50 Credits 03

Sr. No.	Topics	Lectures	Credit
1.	Dairy products 1.1 Introduction t Dairy products	5	03
2.	Definition dairy products 2.1 Classification Indian dairy products	5	
3.	Preparation of heat desiccated milk products: 3.1 Basundi 3.2 khoa	10	
4.	Preparation Technique 4.1 Khoa (Pedha)	4	
5.	Preparation of heat desiccated milk product 5.1Kheer 5.2 Basundi	3	
6.	Heat and acid co- agulated milk products: 6.1 Channa, 6.2 Rasgolla	4	
7.	Heat and acid co- agulated milk products: 7.1 Kalakand, 7.2 Pantoa, 7.3 Paneer.	14	
8.	Total	45	

COURSE:- FOOD PROCESSING (DAIRY MILK)

SEMESTER -V PAPER – XXX FPP 30Traditional Dairy Products-I (PRACTICAL)

Credits 6 Marks 100

Sr No	Name of Practical	Credits
1	Preparation of Khoa based sweet: barfi, gulabjamun.	04
2	Preparation of Khoa based sweet: peda	
3	Preparation of rabri.	
4	. Preparation of kheer	
5	. Preparation of basundi	
6	Preparation of chhana based sweet: rasgolla, sandesh	
7	Preparation of chhana based sweet: kalakand,	
8	. Preparation of chhana based sweet: Paneer	
9	Preparation of makkhan and ghee.	
10	Preparation of flavoured milk.	
11	Preparation of Kulfi	
12	Preparation of whey beverages.	
13	. Preparation of condensed milk.	
14	Preparation of skim milk	
15	Preparation of whole milk powder.	
16	Visit to Dairy	02
17	Total	06

COURSE:- FOOD PROCESSING (DAIRY MILK)

SEMESTER -V PAPER – XXXI FPT 31DAIRY TECHNOLOGY (THEORY)

Marks 50 Credits 03

Sr. No.	Topics	Lectures	Credit
1.	International requirements for export of milk and milk products	7	03
2.	Preservation of milk and milk products by physical preservatives	8	
3.	Preservation of milk and milk products by chemical preservatives	7	
4.	Preservation of milk and milk products by biological and herbal preservatives	7	
5.	Utilization of dairy by-products like whey and high acid milk	8	
6.	Packaging of milk and milk products with modern techniques	8	
7.	Total	45	03

COURSE:- FOOD PROCESSING (DAIRY MILK)

SEMESTER –V PAPER – XXXII FTP 32

FOOD PROCESSING AND PRESERVATION TECHNOLOGY (THEORY)

Marks 50 Credits 03

Sr. No.	Topics	Lectures	Credit
1.	Sources of food, scope and benefit of industrial food preservation, perishable, non perishable food, causes of food spoilage.	05	03
2.	Preservation by salt & sugar – Principle, Method, Equipment and effect on food quality.	05	
3.	Thermal processing methods of preservation – Principle and equipments: Canning, blanching, pasteurization, sterilization, evaporation.	05	
4.	Use of low temperature – Principal, equipment and effect on quality. Chilling, cold storage, freezing. Preservation by drying dehydration and concentration – Principle, Methods, Equipment and effect on quality: Difference, importance of drying & dehydration over other methods of drying and dehydration, equipments and machineries, physical and chemical changes in food during drying and dehydration.	8	
5.	Need and Principle of concentration, methods of concentration – Thermal concentration, Freeze concentration, membrane concentration, changes in food quality by concentration.	8	
6.	Preservation by radiation, chemicals & preservatives. Definition, Methods of Irradiation, Direct & Indirect effect, measurement of radiation dose, dose distribution, effect on microorganisms. Deterioration of Irradiated foods- physical, chemical and biological; effects on quality of foods.	9	
7.	Preservation of foods by chemicals, antioxidants, mould inhibitors, antibodies, acidulates etc. Preservation by fermentation- Definition, Advantages, disadvantages, types, equipments.	5	
8.	Total	45	

COURSE:- FOOD PROCESSING (DAIRY MILK)
SEMESTER –V PAPER – XXXIII FPP 33

FOOD PROCESSING AND PRESERVATION TECHNOLOGY (PRACTICAL)

Credits 6

Marks 100

Sr No	Name of Practical	Credits
1	Demonstration of various machineries used in processing.	
2	Demonstration of effect of blanching on quality of foods. and Preservation of food by high concentration of sugar	04
3	Preparation of jam from fruits and vegetables.	
4	Preservation of food by using acidulants i.e. pickling by acid, vinegar or acetic acid.	
5	Preservation of food by using chemicals.	
6	Preservation of Bread, using mold inhibitors	
7	Preservation Cake using mold inhibitors	
8	Preservation of coconut shreds using humectants.	
9	Drying of pineapple slices, apple slices in cabinet drier.	
10	Demonstration on drying of green leafy vegetables.	
11	Drying of Mango/other pulp by foam mat drying	
12	Drying of different pulp by foam mat drying	
13	Drying of semisolid foods using roller dryers. Drying of foods using freeze-drying process	
14	Demonstration of preserving foods under cold v/s freezing process.	
15	Processing foods using fermentation technique i.e. preparation of sauerkraut.	
16	Industrial Visit	02
17	Total	06

**COURSE:- FOOD PROCESSING (DAIRY MILK)
SEMESTER –V PAPER – XXXIV FPT 34**

FRUITS AND VEGETABLE PROCESSING TECHNOLOGY (THEORY)

Marks 50 Credits 03

Sr. No.	Topics	Lectures	Credit
1.	Production and processing scenario of fruits and vegetable: India and World. Scope of Fruit and Vegetable Preservation Industry in India.	5	03
2.	Present status, constraints and prospectus. Overview of principles and preservation methods of fruits and Vegetables.	5	
3.	Commercial processing Technology of Following fruits and vegetables.	5	
4.	Mango: Pulp, RTS, Squash canned Mango pulp. Toffee amchur, pickle Mango Powder, bar. Banana: Wafers, puree, dried banana powder.	5	
5.	Papaya: Jam, Candy RTS, Nectar, Squash, and Papain. Pomegranate: Juice, Squash, syrup, Anardana, Dalimbmanuka, Anargoli.	5	
6.	Guava; Jelly, Cheese, Juice, Canned guava, Squash, Toffee. Grape: Raisin, Juice, Wine. Fig: Pulp, dried fig, Toffee Powder, bar fig.	5	
7.	Citrus Fruits: Jelly, Marmalade RTS Squash, candy. Aonla; Preserve, Jam, Candy, Juice, Squash, powder, Dried	5	
8.	shreds, chunenprash, pickle, chutney sauce, sweets. Tamarind: Pulp, Powder, Toffee, Bar, RTS, Slab. Jamun: Jelly, RTS, Syrup, wine.	5	
9.	Wood apple: Jelly, Marmalade, Tomato: Ketchup, sauce, puree, soup, chutney, pickle.	5	
10.	Total	45	

COURSE:- FOOD PROCESSING (DAIRY MILK)
SEMESTER –V PAPER – XXXV FPP 35

FRUITS AND VEGETABLE PROCESSING TECHNOLOGY (PRACTICAL)

Marks 100 Credits 06

Sr.No	Name of Practical	Credits
1	Canning of Mango/Guava/Papaya.	04
2	Preparation of Fruit ,Apple/Mango/Guava,/Papaya/Aonla/Strawberry.	
3	Preparation of fruit Jelly: Wood apple, Sweet orange/mandarin/Guava,/Tamarind.	
4	Preparation of fruit marmalade: Ginner Marmalade.	
5	Preparation of fruit preserve and candy	
6	Preparation of grape raisin, dried fig and dried banana.	
7	Preparation of Anardana and dalmabmanuka.	
8	Preparation of papain /guava cheese.	
9	Preparation of pickle, mixed pickle.	
10	Preparation of Amchur.	
11	Preparation of dried onion and garlic, Preparation of Banana and Potato wafers.	
12	Preparation of dehydrated leafy vegetable.	
13	Preparation of fruit RTS and candy.	
14	Preparation of fruit squash.	
15	Preparation of fruit syrup and dried ginger	
16	Industrials visit	02
17	Total	06

**COURSE:- FOOD PROCESSING (DAIRY MILK)
SEMESTER –VI PAPER – XXXVI FPT 36**

NEW PRODUCT DEVELOPMENT (THEORY)

Marks 50Credits 03

Sr. No.	Topics	Lectures	Credit
1.	New product development 1.1 Need, importance 1.2 Formulation for new product development.	4	03
2.	To study the objectives 2.1 Formulation for new product development	4	
3.	Ideas, business philosophy 3.1 Strategy of new product.	6	
4.	Formulation based on sources availability 4.1 Cost competitiveness for concept developments of new products.	5	
5.	Standardization 5.1 Various formulation and product design.	5	
6.	Adaptable technology 6.1 Sustainable technology for standardized formulation for process development.	4	
7.	Process control parameters 7.1 scale-up of new products.	6	
8.	Production trials for new product development 8.1 Lab and pilot scale Quality assessment of new developed products	6	
9.	Market testing and marketing plan. Costing and economic evaluation. Commercialization / product launch	5	
10.	Total	45	03

COURSE:- FOOD PROCESSING (DAIRY MILK)
SEMESTER –VI PAPER – XXXVII PPP37

Sr No	Name of Practical	Credits
1	Research Project	6

COURSE:- FOOD PROCESSING (DAIRY MILK)

SEMESTER –VI PAPER – XXXVIII FPT 38

Farm Animals Breeding (THEORY)

Marks 50Credits 03

Lecture	Topic	Lectures	Credits
1	History and concept of animal breeding	4	03
2	Cell and cell division, spermatogenesis and oogenesis	5	
3	Gene: Functions and role in animal genetics gene actions, gene and genotypic frequencies	6	
4	Gene expression and mutation and laws of probabilities	6	
5	Mendelian principles and Hardy Weinberg law	7	
6	Chromosomes and its abnormalities	7	
7	Variations in quantitative and qualitative traits of farm animals	5	
8	Systems of breeding	5	
	Total	45	03

**COURSE:- FOOD PROCESSING (DAIRY MILK)
SEMESTER –VI PAPER – XXXIX FPT 39**

FOOD TRENDS AND PROGRAMME (THEORY)

Marks 50 Credits 03

Sr. No.	Topics	Lectures	Credits
1.	Food demand and supply – Qualitative and quantitative requirements. Expected Technological advances to meet the needs.	5	03
2.	Future priorities in Food Production needs –Status of Food Industry in India and Abroad.	5	
3.	Food availability, production Trends – Factors of Production – Types of Foods like processed semi processed, Ready to eat Foods,	5	
4.	Fast Foods. Food Characteristics Nutritional significance of major food groups. Present trends of consumption, Further requirements. Consumers change of aptitude in Food Products consumption.	7	
5.	New food products developed Programmes aimed for making more food availability to increasing population and their prospects. Merits and drawbacks, prospects for future growth in India.	7	
6.	National and International Trends and Programmes in Food handling, processing and marketing Potentials and Prospects of developing Food Industry in India.	6	
7.	Food Losses –Factors affecting – Programmes and strategies to eliminate the losses and meet the required demand .Global demand for food	5	
8.	World Food Day- Important and action plans.	5	
9.	Total	45	

COURSE:- FOOD PROCESSING (DAIRY MILK)

SEMESTER –VI PAPER – XXXX FPP 40

FOOD TRENDS AND PROGRAMME (PRACTICAL)

Credits 06

Marks 100

Sr No	Name of Practical	Credits
1	Analysis of Moisture content from given food sample.	04
2	Analysis of Protein from given food sample.	
3	Analysis of Fat from given food sample.	
4	Analysis of Ash from given food sample.	
5	Analysis of Crude fiber from given food sample.	
6	Analysis of Energy Value from given food sample.	
7	Analysis of Carbohydrate from given food sample.	
8	Analysis of Sugar from given food sample.	
9	Analysis of Pectin from given food sample.	
10	Analysis of pH from given food sample.	
11	Analysis of Acidity of Extracted fat from given food sample	
12	Analysis of Acid soluble compounds from given food sample	
11	Analysis of Hardness of given food sample	
12	Analysis of Alkalify of Extracted fat from given food sample	
14	Analysis of Acid insoluble compound from given food sample.	
15	Analysis of Taste of given food sample	
16	Industrial visit	02
17	Total	06

COURSE:- FOOD PROCESSING (DAIRY MILK)
SEMESTER – VI PAPER – XXXXI FPT 41

ICE-CREAM & FAT RICH DAIRY PRODUCTS (THEORY)

Marks 50 Credits 03

Sr. No.	Topics	Lectures	Credit
1.	Ice-cream: 1.1 Introduction 1.2 Definition 1.3 History of development and status of ice-cream industry.	05	03
2.	composition of ice-cream 2.1 Nutritive value of ice-cream 2.2 Different forms of ice-creameg. (kulfi)	05	
3.	Classification of ice-cream 3.1 Standardization of ice-cream. 3.2 Standardization of frozen product.	05	
4.	Role of milk Constituents 4.1 Manufacturing of ice- cream 4.2 Manufacturing of kulfi	05	
5.	Study and role of dairy and non dairy ingredients in ice- cream 5.1 Condensed milk 5.2 Cream 5.3 Butter	05	
6.	Study of stabilizers and emulsifiers, 6.1 Their Classification, 6.2 Properties and role in quality of ice-cream.	05	

7.	Types of freezers. 7.1 Blast freezers 7.2 Normal freezers	02	
8.	manufacturing of ice-cream	03	
9.	physico-chemical properties of ice-cream 9.1 Mix and effect of processing 9.2 Physico- chemical properties of ice- cream mixes and ice- cream.	07	
10.	Over run in ice-cream 10.1 Their control	03	
11.	Packaging, 11.1 Hardening, storage 11.2 Transportation of ice-cream.	05	
12.	Defect in ice-cream, 12.1 Causes and prevention.	05	
13.	Manufacturing of indigenous frozen dessert. 13.1 Kulfi 13.2Malaiburfi,13.3 milk ices and lollies. 13.3 Milk shake.	05	
14.	Total	45	03

COURSE:- FOOD PROCESSING (DAIRY MILK)
SEMESTER –VI PAPER – XXXXII FPP42

ICE-CREAM & FAT RICH DAIRY PRODUCTS (Practical)

Marks 100 Credits 06

Sr No	Name of practical	Credits
1	Study of ice-cream freezer	04
2	Calculation & standard of ice-cream mix	
3	Manufacturing of soft serve plain & fruit flavored ice-cream	
4	Preparation of kulfi	
5	Preparation of milk shake	
6	Study of cream separator	
7	Separation of cream	
8	Study of butter churner& butter making equipment	
9	Role of Ingredients and defects in ice- cream manufacturing	
10	Microbial Examination of Ice- Cream	
11	Manufacturing of Flavour Milk	
12	Manufacturing of Ghee	
13	Manufacturing of Lollies	
14	Manufacturing of table butter & white butter	
15	Manufacturing of butter oil	
16	Visit to Ice cream Industry	02
17	Total	06

Total Credit	Total Semesters 06	180 Credit
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List of Reference Books:

1. Microbiology: M.J. Pelczar.
2. Food Microbiology: M. R. Adam, M. R. Moss.
3. Industrial Microbiology: M, J. Waites, N. L. Morgan, J. S. Rockey, G Higton.
4. Food Bio- Chemistry And Processing: B. J. Simpson.
5. Food Processing: Principle And Applications: J.S. Smith, H. Y. Hui.
6. Agricultural And Food Marketing Management: I. M. Crowford.
7. Bakery Products: Science And Technology: Y. H. Hui.
8. Cereal Processing Technology: G. Owens.
9. Fruits And Vegetable Processing: M.E.Dauthy.
10. Packaging Technology:G. A. Giles.

Reference Books

- 1] A Text book of Animal Husbandry by - G.C. Banarjee
- 2] Milk and milk products----- Eckles, Comb and Mary
- 3] Milk and milk products ---- Harbonsing and Moore
- 4] Modern Dairy Products----- by Lampert
- 5] Dairy India Year Book – 2007 by - P.R. Gupta
- 6] Dairy Plant Engineering and Management by Tufail Ahmed.
- 7] Handbook of Dairy science ----by K. C. Mahanta
- 8] Outlines of Dairy Technology by Sukumar De.
- 9] Milk products in India----- M.R. Shrinivasan&C.P.Anantkrishnan.
- 10] Dairy Technology and Engineering by H.G. Kessler
- 11] Ice-Cream-----by W. S. Arbuckle
- 12] Dairy Processing by Earl.
- 13] Technology of Indian milk products—by R.P.Aneja, B.N.Mathur, R.C. Chandan& A.K. Banerjee.

- 14] Introduction to food safety----- IGNOU, New Delhi.
- 15] Food Safety & Quality Assurance—IGNOU, New Delhi.
- 16) Hazards to food Safety----- IGNOU, New Delhi.
- 17) Reproduction in farm animals---- C. N. Sane & others.
- 18) Hand Book of Indian Dairy Farmers--- Patrick John.
- 19) A Textbook of Genetics----- Dalela R. C. & S. R. Verma.
- 20) Genetics and Breeding in farm animals--- Banerjee & Mukharjee.
- 21) Reproduction in farm animals----- Hafeez.
- 22) Hand book & Physiology of farm animals---- R. D. Frandson.
- 23) Anatomy & Physiology of farm animals--- R. D. Frandson.
- 24) Principles of Dairy Science --- G. H. Schmidt, L. D. Vivek & N. N. Pathak.
- 25) Genes and Evolution----- JHA
- 26) Cattle embryo transfer procedure -----Curtis.
- 27) Genetics of Live stock improvement----- John F. Lesley
- 28) An Introduction to Genetics----- B. K. Jain.
- 29) Population Genetics in animal breeding---- Franz pitcher.
- 30) Industrial & Labour Laws -S.P.Jain
- 31) Industrial Law - P.L. Malik
- 32) Business and Commercial Laws-Sen and Mitra.
- 33) An Introduction to Mercantile Laws-N. D. Kapoor