

**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*

**Mula Education Society's  
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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

## SYALLABUS INDEX

Approved as per SPPU, Pune Ref. No. CBS/1159 Date-31/10/2018

### F.Y. B. VOC, FOOD PROCESSING

SR. NO.	Semester	Paper	COURSE CODE	COURSE TITLE	Credits
1	I	I	FPT01	INTRODUCTION TO CELL BIOLOGY (THEORY)	03
2	I	II	FPT 02	GENETICS (THEORY)	03
3	I	III	FPP 03	GENETICS AND CELL BIOLOGY (PRACTICAL)	06
4	I	IV	FPT 04	INTRODUCTION TO MICRO BIOLOGY (THEORY)	03
5	I	V	FPP 05	INTRODUCTION TO MICRO BIOLOGY (PRACTICAL)	06
6	I	VI	FPT 06	INTRODUCTION TO DAIRY TECHNOLOGY (THEORY)	03
7	I	VII	FPP 07	INTRODUCTION TO DAIRY TECHNOLOGY (PRACTICAL)	06
8	II	VIII	FPT 08	DAIRY FARM MANAGEENT (THEORY)	03
9	II	IX	FPP 09	DAIRY FARM MANAGEMENT (PRACTICAL)	06
10	II	X	FPT 10	ENVIRONMENTAL SCIENCE (THEORY)	03
11	II	XI	FPP 11	ENVIRONMENTAL SCIENCE (PRACTICAL)	05
12	II	XII	FPT 12	BAKERY AND CONFECTIONARY (THEORY)	03
13	II	XIII	FPT 13	CONFECTIONARY (THEORY)	03
14	II	XIV	FPP 14	BAKERY AND CONFECTIONARY (PRACTICAL)	06

## S.Y.VOC, FOOD PROCESSING

15	III	XV	FPT 15	<b>BUSINESS ADMINISTRATION (THEORY)</b>	03
16	III	XVI	FPP 16	<b>BUSINESS ADMINISTRATION (PRACTICAL)</b>	06
17	III	XVII	FPT 17	<b>POST HARVEST TECHNOLOGY (THEORY) (THEORY)</b>	03
18	III	XVIII	FPP 18	<b>POST HARVEST TECHNOLOGY (THEORY) (PRACTICAL)</b>	06
19	III	XIX	FPT 19	<b>FOOD CHEMISTRY ( THEORY)</b>	03
20	III	XX	FPT 20	<b>FOOD BIO- CHEMISTRY (THEORY)</b>	03
21	III	XXI	FPP 21	<b>FOOD BIO CHEMISTRY (PRACTICAL)</b>	06
22	IV	XXII	FPT 22	<b>FOOD ENGINEERING (THEORY)</b>	03
23	IV	XXIII	FPP 23	<b>FOOD ENGINEERING (PRACTICAL)</b>	06
24	IV	XXIV	FPT 24	<b>FOOD LAWS AND REGULATION (THEORY)</b>	03
25	IV	XXV	FPT 25	<b>DAIRY TECHNOLOGY MANAGEMENT (THEORY)</b>	03
26	IV	XXVI	FPP 26	<b>DAIRY TECHNOLOGY MANAGEMENT ( PRACTICAL )</b>	06
27	IV	XXVII	FPT 27	<b>FOOD PACKAGING (THEORY)</b>	03
28	IV	XXVIII	FPP -28	<b>FOOD PACKAGING (PRACTICAL)</b>	06

## T.Y. B. VOC, FOOD PROCESSING

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

**F.Y B.Voc. SYLLABUS  
IMPLIMENTED  
FROM  
JUNE 2018-19**

**COURSE:- FOOD PROCESSING (DAIRY MILK)**

SEMESTER -I PAPER – I FPT 01

INTRODUCTION TO CELL BIOLOGY (THEORY)

Marks 50 Credits 03

Sr. No.	Topics	Lecture	Credit
1.	<b>Introduction to cell biology:</b> 1.1 Definition and scope. 1.2 Division of Cell Biology. 1.3 Stains: Principle and composition of Biological stains.	05	03
2.	<b>Structure of Prokaryotic and Eukaryotic (Plant and Animal Cell)</b> 2.1 Introduction 2.2 Structure of Cells 2.2.1.Prokaryotic Cells 2.2.1.Eukaryotic Cell. 2.3 Shape and Size of Cells	05	
3.	<b>Structure and Function of Cell Member</b> 3.1 Introduction: 3.2.Chemical composition of Plasma Member 3.2.1 Proteins 3.2.2Lipids 3.3.Member Model 3.3.1.Bilayer Model 3.2.2.Fluid Mosaic Model 3.2.3.Lipid Bilayer Model 3.4 Function of Cell Member 3.5 Membrane Receptors 3.6 Modification of Plasma member 3.6.1.Microvilli 3.6.2.Desmosomes 3.6.3.Plasmadesmo 3.7 Transport System 3.7.1.Passive Transport 3.7.2. Active Transport 3.8Pinocytes 3.9.Phagocytosis	05	
4.	<b>Study of Cell organelles with Respect to structure and Functions</b> 4.1Endoplamic reticulum 4.1.1Morphology 4.1.2Types of Endoplasmic Reticulum 4.2.Golgi complex 4.2.1.Morphology 4.2.2.Structure of Golgi Complex 4.2.3.Function of Golgi complex	04	
5.	<b>Lysosomes</b> 5.1 Origin, occurrence and morphology 5.2 Ultra structure and functions	07	
6.	<b>Mitochondria:</b> 6.1 Origin, occurrence and morphology 6.2 Ultra structure and functions.	04	



<b>7.</b>	<b>Nucleus:</b> 7.1 Shape, Size, number and position 7.2 Ultra structure of nuclear membrane 7.3 Nucleolus: general organization, chemical composition and functions.	<b>07</b>	
<b>8.</b>	<b>Cell division and their significance:</b> 7.1 Cell cycle in brief. 7.2 Mitosis 7.3 Meiosis	<b>08</b>	
<b>9.</b>	<b>Total</b>	<b>45</b>	<b>03</b>

**COURSE:- FOOD PROCESSING (DAIRY MILK )****SEMESTER -I PAPER – II FPT 02****GENETICS (THEORY)****Marks 50 Credits 03**

<b>Sr. No.</b>	<b>Topics</b>	<b>Lecture</b>	<b>Credit</b>
<b>1.</b>	<b>Introduction to genetics:</b> 1.1 Genetical terminology. 1.2 Definition, Concept of heredity and variations, 1.3 Branches and Applications of Genetics.	<b>8</b>	<b>3</b>
<b>2.</b>	<b>Mendelism:</b> 2.1 Selection of experimental material, 2.2 Monohybrid cross, Dihybrid cross, 2.3 Law of dominance, Incomplete dominance, 2.4 Law of segregation/law of purity of gametes, 2.5 Law of independent assortment, 2.6 Back cross and Test cross.	<b>8</b>	
<b>3.</b>	<b>Multiple Alleles:</b> 3.1 Concept, characteristics and importance of multiples alleles, 3.2 ABO & Rh-blood group system and its medicolegal importance. 3.3 Concept of polygenic inheritance with reference to coat color in Rat.	<b>8</b>	
<b>4.</b>	<b>Gene Mutation:</b> 4.1 Definition 4.2 Types of mutations: spontaneous, induced, somatic, gametic, forward, reverse. 4.3 Types of point mutation- deletion, insertion, substitution, transversion, transition. 4.3 Mutagenic agents. a) UV radiation and ionising radiation. b) Base analogs, alkylating and intercalating agents.	<b>8</b>	
<b>5.</b>	<b>Chromosomes:</b> 5.1 Introduction to morphology and composition 5.2 Classification based on the centromeric position 5.3 Types of chromosome (autosomes and sex chromosome) 5.2 Chromosomal aberrations: structural changes.	<b>7</b>	
<b>6.</b>	<b>Application of genetics:</b> 6.1 Genetic counseling. 6.2 Concept of genetic Engineering	<b>6</b>	
<b>7.</b>	<b>Total</b>	<b>45</b>	

**COURSE:- FOOD PROCESSING (DAIRY MILK  
SEMESTER -I PAPER – III FPP 03  
GENETICS AND CELL BIOLOGY (PRACTICAL)  
Marks 100 Credits 0 6**

<b>Sr. No.</b>	<b>Title of Practical</b>	<b>Credit</b>
<b>1.</b>	<b>Introduction</b> -Study of Microscopy: - Simple, Compound.	<b>04</b>
<b>2.</b>	Cytological techniques-preparation of Fixatives,	
<b>3.</b>	Preparation of stains (Acetocarmine and Aceto-orcein).	
<b>4.</b>	Study of Prokaryotic Cell.	
<b>5.</b>	Study of Eukaryotic Cell.	
<b>6.</b>	Study of cell organelles by using Models, Charts, Slides & electron photo micrographs.	
<b>7.</b>	Study of various stages of mitosis	
<b>8.</b>	Study of various stages of meiosis.	
<b>9.</b>	Study of Drosophila	
<b>10.</b>	Study of Mutant in Drosophila	
<b>11.</b>	Study of Monohybrid ratio by providing hypothetical data and deducing applicability of Mundelein laws.	
<b>12.</b>	Study of Dihybrid ratio by providing hypothetical data and deducing applicability of Mundelein laws.	
<b>13.</b>	Study of blood groups in human (ABO and Rh)	
<b>14.</b>	Study of Karyotypes in human.	
<b>15.</b>	Study of genetic traits in human beings (tongue rolling, widow's peak, ear lobes, color blindness and PTC tasters/ non tasters)	
<b>16.</b>	Industrial / Field visit	<b>02</b>
<b>17.</b>	Total	<b>06</b>

**COURSE:- FOOD PROCESSING (DAIRY MILK)**  
**SEMESTER -I PAPER – IV FPT 04**

**INTRODUCTION TO MICRO BIOLOGY (THEORY)**

**Marks 50      Credits 03**

Sr. No.	Topics	Lectures	Credit
1.	<b>Introduction</b> -Basic aspects and scope of food microbiology. Intrinsic and extrinsic <b>factors</b> that affect microbial growth in foods.	10	<b>03</b>
2.	<b>Microbial spoilage</b> - fruits, fruit juices, vegetables, cereals, meat, poultry, sea foods, carbonated soft drinks, canned foods; control of spoilage.	05	
3.	<b>Industrial Microbiology</b> : Fermentation processes: the range, components and types (submerged, surface and solid state fermentation): criteria for selection of industrially important microorganisms; media for industrial and inoculums development; down-stream processing of fermented products.	10	
4.	<b>Fomenters</b> : types, functions, design and control	10	
5.	<b>Importance of Microorganism</b> - processes involved in the production of industrial alcohol, vinegar, soy based fermented products, organic acids (citric lactic), enzymes (protease, lipase and rennet), vitamin (B-12), antibiotic (nisin) and microbiology of effluent treatment in food industry.	10	
6.	Total	45	<b>03</b>

**COURSE:- FOOD PROCESSING (DAIRY MILK)**  
**SEMESTER -I PAPER – V FPT 0 5**

**INTRODUCTION TO MICRO BIOLOGY (PRACTICAL.)**

**Marks 100      Credits 06**

<b>Sr No</b>	<b>Name of Practical</b>	<b>Credits</b>
1	General instruction for microbiological laboratory. Microscope- simple and compound; Microbiological equipments; autoclave, hot air oven, incubator, centrifuge, colorimeter, laminar airflow, membrane fi	<b>04</b>
2	. Simple staining- methylene blue; crystal violet; negative staining. Differential staining (Gram, spore, acid fast).	
3	Mortality of microorganisms; hanging drop technique. Measurement of microorganisms by micrometry	
4	Preparation of commonly used growth media liquid and solid: simple and differential media. Isolation technique for microorganisms- Streak & pour plate Enumeration of microorganisms in air and soil.	
5	. Enumeration of microorganisms in water: total viable count, coliform (MPN).	
6	. Serial dilution technique.	
7	Anti- microbial activity by disc and well diffusion techniques.	
8	. Microbiological examination of: fresh and canned fruits/ vegetables/ juices; flour and bread, eggs and meat	
9	Production of nisin and assaying the antimicrobial activity of the culture.	
10	Shelf life study of prepared fruit juices.	
11	Microbiological examination of: fresh and canned fruits/ vegetables/ juices/ milk, flour and bread, eggs and meat.	
12	Preparation of Vinegar and beverage	
13	Preparation of Idli.	
14	Preparation of Tofu.	
15	Preparation of Saurkraut.	
16	Educational tour to food processing/ fermentation industries.	<b>02</b>
	<b>Total</b>	<b>06</b>

**COURSE:- FOOD PROCESSING (DAIRY MILK)****SEMESTER – I PAPER – VI FPT 06****INTRODUCTION TO DAIRY TECHNOLOGY (THEORY)****Marks 50****Credits 03**

<b>Sr. No.</b>	<b>Topics</b>	<b>Lectures</b>	<b>Credit</b>
1.	Introduction Dairy Industry 1.1 Scope & Importance of Dairy Industry 1.2 Present status of Dairy Industry in Maharashtra	3	<b>03</b>
2.	Present status of Dairy Industry in India 2.1 Milk production in India 2.2 Sources Of Milk 2.3 Density Of Milk 2.4 Milk Capita Consumption 2.5 Indian Standard	3	
3.	Definition of milk, 3.1 composition of milk 3.2 different livestock species	8	
4.	Physico- chemical properties of milk A) Physico 4.1.1 test & odder 4.1.2 specific gravity 4.1.3 boiling & freezing point 4.1.4 refractive index & electrical conductivity viscosity surface tension B) chemical properties 4.2.1 Acidity 4.2.2 Buffering Action	5	
5.	Factors affecting composition of Milk 5.1.1 Milking interval 5.1.2 Gestation 5.2 other factors 5.2.1 Pregnancy 5.2.2 Environmental temp	7	
6.	Factors affecting yield of Milk  6.1.1 Breed 6.1.2 Species 6.1.3 hormones 6.1.4 season	10	
7.	Microbial quality of raw milk and standards for different market milk	5	
8.	Nutritional importance of milk and its constituents 8.1 Vitamins 8.2 Proteins 8.3 Minerals 8.4 Amino Acid	5	
	Total	45	<b>03</b>

**COURSE:- FOOD PROCESSING (DAIRY MILK)**  
**SEMESTER – I PAPER – VII FPP 07**

**INTRODUCTION TO DAIRY TECHNOLOGY (PRACTICAL)**

**Marks 100**

**Credits 06**

<b>Sr No</b>	<b>Name of practical</b>	<b>Credit</b>
<b>1</b>	Study of platform tests	<b>04</b>
<b>2</b>	Sampling of milk and milk products	
<b>3</b>	Determination of Fat by Gerber's method.	
<b>4</b>	Determination of SNF of milk.	
<b>5</b>	Determination of TS of milk.	
<b>6</b>	Determination of Specific gravity of milk.	
<b>7</b>	Determination of acidity of milk.	
<b>8</b>	Determination of adulteration in milk and milk products	
<b>9</b>	Study of Standardization of milk by Pearson's method.	
<b>10</b>	Study of cream separator and separation of cream.	
<b>11</b>	Study of cleaning of dairy equipments.	
<b>12</b>	Study of sanitization of dairy equipments.	
<b>13</b>	Visit to milk processing plants.	<b>02</b>
	<b>Total</b>	<b>06</b>

**COURSE:- FOOD PROCESSING (DAIRY MILK)****SEMESTER –II PAPER –VIII FPT 08****DAIRY FARM MANAGEENT (THEORY)****Marks 50 Credits 03**

<b>Sr. No.</b>	<b>Topics</b>	<b>Lectures</b>	<b>Credit</b>
1.	<b>Live stock management</b> ;-Terminology used in livestock management Organic livestock production- definition, importance, principle, standards, certifications, SWOT analysis, A1 and A2 milk, Integrated livestock farming	10	<b>03</b>
2.	<b>Indian breed</b> -Important Indian and exotic breed of cattle and buffalo	5	
3.	<b>Feeding and management</b> - of calf, heifer, dry and milking animals Feeding and management of dry, pregnant , draft animals and breeding bulls	10	
4.	<b>Cattle disease</b> -Diseases and it's preventive, curative measures in cattle and buffalo	5	
5.	<b>Reproduction</b> -Bovine male and female reproductive system	5	
6.	<b>Ecology</b> -Effect of climate change on livestock production	5	
7.	Cost of milk production, economical unit of cattle and buffalo	5	
	<b>Total</b>	<b>45</b>	<b>03</b>



**COURSE:- FOOD PROCESSING (DAIRY MILK)****SEMESTER –II PAPER –IX FPP 09****DAIRY FARM MANAGEENT (PRACTICALS)****Marks 100****Credits 06**

Sr.No	Name of Practical	Credits
1	External body parts of cattle	<b>04</b>
2	External body parts of buffalo.	
3	External body parts of Sheep	
4	External body parts of Goat	
5	Routine management, practices followed on livestock farm.	
6	Method of handling and restraining of Animals	
7	Method of identification marks and dehorning of animals.	
8	Recording of pulse rate of animals	
8	Recording of Respiration rate of animals	
10	Recording of body temperature of animals	
11	Preparation of feeding scheduled and feeding different categories of cattle.	
12	Preparation of feeding scheduled and feeding different categories of buffalo	
13	Clean and hygienic milk production and milking methods	
14	Judging of animals for dairy and draft purpose.	
15	Utilization of dairy farm waste i.e. dung, urine, etc.	
16	Field visit to dairy farms.	
	Total	<b>06</b>

**COURSE:- FOOD PROCESSING (DAIRY MILK)**

**SEMESTER -II PAPER XI FPT 10 ENVIRONMENTAL SCIENCE (THEORY)**

**Marks 50 Credits 03**

Sr. No.	Topics	Lectures	Credit
1	<b>Introduction of Environment.</b> Definition of Environment and Environmental Science,Environmental Science - Scope and Importance, <b>Biosphere:</b> Definitions,	2	<b>03</b>
2	<b>Evolution</b> of the universe ,Evolution of the elements; origin of the earth, Solar system, Evolution of life, Atmosphere of the primitive earth.	2	
3	<b>Ecology</b> Definition; branches; scope; and its relation to other divisions of sciences,,Autecology and synecology.,Ecosystem- Concept and structure of ecosystem.,Functions of ecosystem,Biotic components of ecosystem (producer, consumer and decomposer).,Abiotic components of ecosystem.	06	
4	<b>Soil</b> -Soil formation.Types of Soil.,Soil profiles.,Physical and chemical characters of soil.,Biological characters of Soil,Topographic factors.	3	
5	<b>Sources of Water :</b> Natural Water Resources and their types,Precipitation: Types of precipitation, Rainfall measurement (Rain gauge),Recording type, Non Recording type. Surface sources: Rivers, Lakes, Streams, Ponds, Storage reservoir.	4	
6	<b>Ecosystem</b> ,Basic concepts, components of Ecosystem, Trophic levels, food chains and food webs,Ecological pyramids,Ecosystem functions,Energy flow in ecological systems, energy efficiencies.	05	
7	<b>Ecosystem</b> -Terrestrial ecosystem -Dessert ecosystem,Grassland ecosystem,Forest ecosystem (Evergreen and Deciduous),Mountain ecosystem.Marsh land.  Aquatic Ecosystem:Freshwater ecosystem Lentic ecosystem- Ponds and Lakes;,Lotic ecosystem – Rivers and Streams.Marine ecosystem: Oceans , Seas, and Estuaries.	10	
8	<b>Biogeochemical cycles</b> Gaseous cycles,Oxygen cycle,Carbon cycle,Nitrogen cycle.Phosphorus cycle,Sulphur cycle.	4	
9	<b>Succession</b> ,Concepts of succession,Types of Succession.Trends in succession.Climax and stability.Co-evolution and group selection.	4	
10	<b>Biodiversity conservation-</b> International and national efforts to conserve biodiversity.Socio-cultural aspects of biodiversity.Biotechnological needs for biodiversity conservation.Traditional knowledge and biodiversity conservation.	5	
	<b>Total</b>	45	<b>03</b>

**COURSE: - FOOD PROCESSING (DAIRY MILK)  
SEMESTER -II PAPER – XI FPP 11**

**ENVIRONMENTAL SCIENCE (PRACTICAL)**

**Marks 100 Credits 06**

Sr No	Name of Practical	Credits
1	Analysis of frequency distribution of plants in a piece of vegetation by quardrat method	<b>04</b>
2	To determine chlorophyll content of the given plant material.	
3	Quantitative analysis of soil pH and water holding capacity	
4	Comments on life cycle of some economically important insects	
5	Identification of museum specimens of some economically important fishes.	
6	To study the ‘Laboratory Safety Rules’ and First-Aid and emergency treatment in laboratory	
7	Identification of phytoplankton and zooplankton samples from different water Sample.	
8	To study the ecological adaptations of hydrophytes, xerophytes, mesophytic and halophytic plants / animals specimens	
9	Determination of leaf area index	
10	To study the laboratory equipments and instruments (Oven, , Autoclave, Electronic balance, pH meter, Colorimeter, etc).	
11	To study the laboratory equipments and instruments (Oven, Microscope, Incubator, Inoculation chamber	
12	Estimation of Alkalinity of provided water sample	
13	Estimation of total hardness from water sample by E. D. T. A. method	
14	Estimation of Acidity from provided water sample.	
15	Estimation of chlorides from water sample by Argentometric method	
16	Visit to water purification plant	<b>02</b>
	Total	<b>06</b>

**COURSE:- FOOD PROCESSING (DAIRY MILK)**

SEMESTER -II PAPER – XII FPT 12

**BAKERY AND CONFECTIONARY (THEORY)****Marks 50 Credits 03**

<b>Sr. No.</b>	<b>Topics</b>	<b>Lectures</b>	<b>Credit (4)</b>
1.	<b>History-</b> Traditional confectionary goods, Types of confectionary, classification. Basic Technical considerations, TS, TSS, pH, acidity, ERH, Sugar, Invert Sugar, Glucose syrup, RH, Crystallization.	10	<b>03</b>
2.	<b>Raw Materials:</b> Sugar, Sugar qualities, Physical, Chemical, Optical properties. Sugar grinding, Dextrose, Fructose, Lactose, caramel, maltose, Honey, sorbitol, xylitol, Iso malt, soy maltose, Polydextrose, Lactitol, Maltitol. Whipping, Release agent, thickeners, Acidulents, Flavours, for confectionery, emulsifiers and other additives, starch derivatives, colours used in confectionary. Production of glucose syrup, Acid hydrolysis, enzyme hydrolysis	10	
3.	<b>Cocoa Processing:</b> Cocoa bean, processing, roasting, Fermentation, Production of Cocoa butter Cocoa powder, its quality. Chocolate Processing: Ingredients, Mixing, Refining, Conching, Tempering, Molding, Cooling, Coating, Fat bloom.	10	
4.	<b>High Boiled Sweets:</b> Introduction, Composition, Properties of high boiled sweets, preparation of high boiled sweets, Traditional, batch and continuous Method of preparation. Different types of higher boiled sweets, Recipes. Caramel: Definition, Composition, Factors affecting quality of caramel, caramel Manufacture process, batch type, continuous types, checking of faults in caramel. Toffee: Definition, Composition, types of toffee Ingredient and their role. Batch and Continuous method of toffee. Fondant: Fudge/Creamy: ingredients, Methods, Productivity. Lozenges: Definition recipe, Method of Manufacture, Compositions, factors affecting quality,.	15	
	Total	45	<b>03</b>

**COURSE:- FOOD PROCESSING (DAIRY MILK)**  
**SEMESTER -II PAPER – XIII    FPT 13 CONFECTIONARY (THEORY)**

**Marks 50    Credits 03**

Sr No	Topics	Periods	Credits
1	Marshmallow and. Nougat: Definition, composition, recipe, and method of manufacture. Nougat. Panning: Process, types of Panning, soft and hard panning.	9	03
2	<b>Quality of confectionery</b> , Standards and regulations, Packaging requirements of confectionary, economics and marketing of confectionary goods.	9	
3	<b>Bakery Products-</b> Role of Bakery ingredients (major and minor), From Hard Wheat: Bread: Processes of bread making mainly straight and sponge, role of each ingredient, quality control.	9	
4	<b>Macaroni Products:</b> Including spaghetti, Noodles, Vermicelli Process	9	
5	<b>Nutritional improvement of bakery Products.</b> Setting of bakery Unit, Bakery norms. Specifications for raw materials. Packaging. Marketing of Products. Project report on bakery. Visit to wheat milling Industry. Visit to Bakery.	9	
	<b>Total</b>	<b>45</b>	<b>03</b>

**COURSE:- FOOD PROCESSING (DAIRY MILK)**  
**SEMESTER -II PAPER –XIV FPP 14 BAKERY AND CONFECTIONARY (PRACTICAL)**

**Marks 100 Credits 04**

Sr No	Name of practical course	Credits
1	Classification of wheat based on physicochemical properties.	<b>04</b>
2	Study of Physico chemical analysis of Flour.	
3	Quality Testing of flour: Falling number and $\alpha$ amylase activity,	
4	Quality Testing of flour Sedimentation value	
5	Quality testing Pelshenke value, Farinograph,	
6	Quality testing Mixograph, Extensiograph, Alveograph	
7	Manufacture of Bread Types,	
8	Manufacture of Bread, Faults, remedies, shelf life bread:	
9	Determination of Reducing Sugar cuits	
10	,Manufacture of cookies, crackers, buns	
11	Types and quality. Other baked products Pastry, pizza.	
12	Extruded Products from wheat: Vermicelli, noodles etc.	
13	Determination of Physical properties of sugar.	
14	Production of invert sugar.	
15	Determination of Moisture in Sugar.	
16	Field visit/Industrial visits	<b>02</b>
1	Total	<b>06</b>

**S.Y B.Voc**  
**SYLLABUS**  
**IMPLIMENTED**  
**FROM**  
**JUNE 2019-20**

**COURSE:- FOOD PROCESSING (DAIRY MILK)**

SEMESTER –III PAPER – XV FPT 15

**BUSINESS ADMINISTRATION**

Marks 50 Credits 03

Sr No	Topic	Lectures	Credits
1	<b>INTRODUCTION AND FUNCTIONS OF MARKETING</b> 1.1 Marketing – Definitions, Concept, importance and functions of marketing, 1.2 Service Marketing: 7P's of services marketing, 1.3 E-Marketing 1.4 Digital marketing: meaning, importance of digital marketing <b>MARKETING MIX</b> 2.1 Product mix and Price mix Product mix: concept of a product, PLC, Product simplification, product diversification, new product development 2.2 Price mix : meaning, importance of price mix , factors influencing pricing , pricing methods and recent trends 2.3 : Place mix and Promotion mix c. Place mix: meaning and concepts of channel of distribution, types of channel of distribution or intermediaries, Factors influencing selection of channels, d. Promotion mix: meaning, elements of promotion mix, types of media: outdoor, indoor, print, press,	10	03
2	<b>INTRODUCTION OF FINANCE –</b> Definition - Nature and scope of finance function <b>Sources of Finance</b> 2.1 External: - Shares, Debentures, Public Deposits, Borrowing from banks: - meaning, types, advantages and limitations of these sources. 2.2 Internal: - Reserves and surplus, Bonus shares, Retained earnings, 5 Dividend policy; Meaning, advantages and limitations of these sources Capital Structure Meaning - criteria for determining capital structure.	10	
3	<b>INTRODUCTION TO COMMUNICATION</b> Meaning, Definition, objective, Process, importance. Principles of good Communication, <b>Types of communication</b> Written Communication, Verbal & Non-verbal Communication Techniques of Effective Speech, The Art of Listening, Principles of Good Listening, Phone Etiquette, Grapevine <b>Business Correspondence</b> Component and layout of Business letter, Drafting of letters: Enquiry letter, Placing order, Complaints	10	



	<p>and follow up letters, Sales letter, Application for employment and Resume, Notices, , Email etiquette</p> <p><b>Media of Communication</b> Introduction, Advantages and Disadvantages of Media of Communication</p>		
<b>4</b>	<p><b>INSTITUTIONAL SUPPORT TO NEW VENTURE</b> <b>(Students are expected to study the assistance scheme of following institutions)</b></p> <p>4.1 District Industries Center(DIC) 4.2 Maharashtra Industrial Development Corporation(MIDC) 4.3 Small Industries Service Sector(SISI) 4.4 Micro, Small &amp; Medium Enterprise(MSME)</p> <p>Financial Assistance for Small Enterprise: Institutional: a)Bank Loan b) Angel Funding c) Venture Funding d) Self Employment Schemes of Government of Maharashtra e) Government Financial Institutions: Khadi and Village Industries Board(KVIB),Rajiv Gandhi Udyami Mitra Yojana (RUGMY) f) Prime Minister Employment Generation Programme (PMEGP)</p>	<b>5</b>	
<b>5</b>	<p><b>INTRODUCTION TO HUMAN RESOURCE MANAGEMENT:</b></p> <p>5.1 5.1.1 Definition and concept of human resource, 5.1.2 Importance of human resource management, 5.1.3 Functions of human resource management,</p> <p><b>5.2 Human Resources Planning:</b> 5.2.1Definition and objectives of Human Resource planning. 5.2.2 Sources of Recruitment- Methods of Recruitment,</p> <p><b>5.3 Training and Development:</b> 5.3.1 Meaning and Definition, Needs, Importance of 5.3.2 Training- 5.3.3 Training Methods</p> <p><b>5.4 Performance Appraisal &amp; Wage and Salary Administration:</b></p> <p><b>5.4.1 Part A : Performance Appraisal</b> Concept and objectives of performance Appraisal. Performance Appraisal Methods.</p> <p><b>5.4.2 Part B : Wage and Salary Administration</b> Methods of Wage Payments. Determining the level of remuneration. Profit sharing, Fringe Benefits</p>	<b>10</b>	
	Total	<b>45</b>	<b>03</b>

#### Reference

1. P. C. Pardeshi - Human Resource Management, C. B. Matoria - Personnel Management
2. K. Ashwathappa – Organisational Behaviour, V.S. P. Rao- Human Resource Management. Texts and cases, Business Communication (Principles, Methods and Techniques) - Nirmal

- Singh- Deep & Deep Publications Pvt. Ltd, New Delhi., Essentials of Business Communication – Rajendra Pal & J. S. Korlhalli- Sultan Chand & Sons, New Delhi.
3. Media and Communication Management – C.S.Raydu - Himalaya Publishing House, Mumbai.
  4. Professional Communication- Aruna Koneru- Tata McGraw-Hill Publishing Co. Ltd, New Delhi.
  5. Creating a Successful CV - Siman Howard - Dorling Kindersley.

**COURSE:- FOOD PROCESSING (DAIRY MILK)**

**SEMESTER -III PAPER –XVI FPP 16**

**BUSINESS ADMINISTRATION**

**(PRACTICAL)**

**Marks 150**

**Credits 06**

<b>Sr No</b>	<b>Name of Practical</b>	<b>Credits</b>
<b>1</b>	Study of Advertisement of Particulars product and present	<b>04</b>
<b>2</b>	Study of packaging strategies of products	
<b>3</b>	Observation of Customers and salesman and role play	
<b>4</b>	Study of recruitment and selection process followed by company	
<b>5</b>	Mock interview	
<b>6</b>	Study of business correspondence with other agencies	
<b>7</b>	Study the various techniques of communication and presentation	
<b>8</b>	Study the financial resources available in the market	
<b>9</b>	Study the Government Scheme available for business	
<b>10</b>	Project work.	
<b>11</b>	Industrial Visit / Market Survey	<b>02</b>
<b>12</b>	Presentation on results of market survey	
	<b>Total</b>	<b>06</b>

**References**

1. Industrial Law - P.L. Malik
2. Business and Commercial Laws-Sen and Mitra.
3. An Introduction to Mercantile Laws-N. D. Kapoor

**COURSE:- FOOD PROCESSING (DAIRY MILK)**  
**SEMESTER -III PAPER – XVII FPT 17 COURSE:- FOOD PROCESSING (DAIRY MILK)**  
**SEMESTER -III PAPER – XVII FPT 17**

**POST HARVEST TECHNOLOGY (THEORY)**

**Marks 50 Credits 03**

Sr. No.	Topics	Lectures	Credit
1.	Introduction of post harvest technology 1.1 Cereals; 1.2 Pulses ; 1.3 Oil seeds,; 1.4 Spices; 1.5 Tea, coffee and cocoa; 1.6 Production of spices in India	6	<b>03</b>
2.	Importance of post harvest technology 2.1 Management of plantation crops 2.2 Adulteration study.	6	
3.	Post harvest technology of major and minor spices : 3.1 Black pepper, oleoresin and volatile. Cardamom, ginger, chilies, turmeric powder, and Ajwan, coriander, cumin, cinnamon, fenugreek, garlic, mustard, mace and nutmeg, 3.2 Onion, saffron, tamarind, cloves, mint, vanilla, asafetida 3.3 Preservation and storage study	05	
4.	Post harvest technology of fruits 4.1 Vegetables 4.2 Oil seed processing.	10	
5.	Post harvest technology of tea 5.1 Post harvest technology of coffee 5.2 Cocoa processing technology.	8	
6.	Rice and wheat milling introduction 6.1 Composition nutritional value 6.2 Milling process and cleaning	5	
7.	E- learning, seminar ,workshop, group discussion	5	
8.	Total	45	

**References:**

1. Haard, N.F. and Salunkhe, D.K. 1975.
2. Postharvest Biology and Handling of Fruits and Vegetables. AVI, Westport. Kader, A. A. 1992.
3. Postharvest Technology of Horticultural Crops, 2nd Ed. University of California, Division of Agriculture and National Resources, California. Salunkhe, D.K. and Kadam, S.S. Ed. 1998.

**COURSE:- FOOD PROCESSING (DAIRY MILK)**

**SEMESTER –III PAPER – XVIII FPP 18  
POST HARVEST TECHNOLOGY (PRACTICAL)**

**Marks 100 Credits 06**

Sr.No	Name of Practical	Credits
1	Preservation of fruits and vegetables by different method	<b>04</b>
2	Preservation of fruits and vegetables by traditional methods	
3	Preservation of fruits and vegetables by dehydration method	
4	Preservation of fruits and vegetables by freezing	
5	Preservation of fruits and vegetables by pickling	
6	Chemical analysis of tea	
7	Chemical analysis of coffee	
8	To study adulteration test of turmeric	
9	To study adulteration test of red chilies	
10	Adulteration test of black pepper	
11	To study adulteration test of tea and coffee	
12	Estimation of protein from fruits	
13	To study Glycemic index of fruits	
14	Study of Storage and packaging of spices and vegetables	
15	Visit to spice industry or fruit and vegetables processing plant	
16	Minor project Adulteration study of khoa and ghee	<b>02</b>
17	Total	<b>06</b>

**References :**

1. Tea, Coffee, and Cocoa: A Practical Treatise on the Analysis of Tea, Coffee, Cocoa, Chocolate, Mate (Paraguay Tea), Etc - Primary Source Edition Paperback – Import, 19 Feb 2014
2. Altekruise, S. F., Street, D. A., Fein, S. B., Levy, A. S. (1996). Consumer knowledge of foodborne microbial hazards and food-handling practices. J Food Protect.; 59:287-294. Altekruise, S. F., Street, D. A., Fein, S. B., Levy, A. S. (1996).
3. Consumer knowledge of food-borne microbial hazards and food handling practices. Journal of Food Protections. 59, 287–294
4. Cereal Processing Technology: G. Owens.
5. Fruits And Vegetable Processing: M.E. Dauthy.
6. Packaging Technology: G. A. Giles.

**COURSE:- FOOD PROCESSING (DAIRY MILK)****SEMESTER –III PAPER – XIX FPT 19****FOOD CHEMISTRY (THEORY)****Marks 50****Credits 03**

<b>Sr. No.</b>	<b>Topics</b>	<b>Lectures</b>	<b>Credit</b>
1.	Water: 1.1 Water binding and chemical reactions mediated by water.	03	<b>03</b>
2.	Food Proteins: 2.1 Classification, 2.2 physico-chemical properties, 2.3 Reaction involved in processing, Reactions with alkali,	07	
3.	Enzyme 3.1 catalysed reactions involving hydrolysis and proteolysis, 3.2 Theories of formation of texturised proteins.	07	
4.	Lipid : 4.1 Reactions involved during deep frying of food viz., 4.2 autoxidation of saturated acyl lipids and polymerization.	10	
5.	Lipoprotein and membrane; 5.1 definition, 5.2 classification and involvement in the formation of biological membranes.	13	
6.	Unsaponifiable matter contents in various fats and oils. 6.1 Edible fats and oils, 6.2 classification and 6.3 chemical composition.	03	
7.	Seminars, Workshop, Group discussion	02	
8.	Total	45	

**References**

1. Food Bio- Chemistry And Processing: B. J. Simpson.
2. Biology and Handling of Fruits and Vegetables. AVI, Westport. Kader, A. A. 1992.
3. Postharvest Technology of Horticultural Crops, 2nd Ed. University of California, Division of Agriculture and National Resources, California. Salunkhe, D.K. and Kadam, S.S. Ed. 1998.
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.

**COURSE:- FOOD PROCESSING (DAIRY MILK)****SEMESTER –III PAPER – XX FPT 20****FOOD BIO CHEMISTRY (THEORY)****Marks 50****Credits 03**

<b>Sr.No</b>	<b>Topics</b>	<b>Periods</b>	<b>Credits</b>
<b>1</b>	<b>CARBOHYDRATES:</b> 1.1 Legumes, jellies polysaccharide viz. linear, branched and modified. 1.2 Properties and utilization of common polysaccharides, viz. cellulose, glycogen, hemicellulose and pectin.	<b>6</b>	<b>03</b>
<b>2</b>	<b>ENZYMATIC DEGRADATION OF POLYSACCHARIDES, VIZ.</b> 2.1 Agar, alginate. 2.2 Carrangeenan, gums and starch. 2.3 Production of dextrans and malto dextran.	<b>6</b>	
<b>3</b>	<b>FOOD ENZYMES:</b> 3.1 Hydrolases and lipases, utilization in food industry, effect of inhibitors, 3.2 pH and temperature. Minerals in foods: Main Elements, trace elements in eggs, cereal and cereal products, vegetables and fruits.	<b>6</b>	
<b>4</b>	<b>PROTEINS,</b> 4.1 vitamins and 4.2 minerals	<b>6</b>	
<b>5</b>	<b>FOOD ADDITIVES:</b> 5.1 amino acids, minerals. 5.2 Aroma substance flavour enhancers-monosodium glutamate, nucleotides. 1Sugar substitutes, 5.3 sorbitol. Sweeteners-saccharin 5.4 cyclamate, Food colors.	<b>12</b>	
<b>6</b>	<b>ANTI-NUTRITIONAL FACTORS</b> 7.1 Food contaminant, 7.2 Toxic-trace elements, radio nuclides.	<b>6</b>	
<b>7</b>	7.1 Seminars, 7.2 Group discussion. 7.3 Workshop	<b>03</b>	
<b>8</b>	<b>Total</b>	<b>45</b>	

**References**

1. Food Bio- Chemistry And Processing: B. J. Simpson

**COURSE:- FOOD PROCESSING (DAIRY MILK)**

**SEMESTER –III PAPER – XXI FPP 21**

**FOOD BIO CHEMISTRY (PRACTICAL )**

**Marks100**

**Credits 06**

	<b>Name of Practical</b>	<b>Credits</b>
<b>1</b>	To study different methods of Biochemical Analysis	<b>04</b>
<b>2</b>	Analysis of Moisture content from given food sample.	
<b>3</b>	Analysis of Protein from given food sample.	
<b>4</b>	Analysis of Fat from given food sample.	
<b>5</b>	Analysis of Ash from given food sample.	
<b>6</b>	Analysis of Crude fiber from given food sample.	
<b>7</b>	Analysis of Carbohydrate from given food sample.	
<b>8</b>	Analysis of Energy Value from given food sample.	
<b>9</b>	Analysis of Sugar from given food sample.	
<b>10</b>	Analysis of Pectin from given food sample.	
<b>11</b>	Analysis of pH from given food sample.	
<b>12</b>	Analysis of Acidity of Extracted fat from given food sample.	
	Analysis of Glycogen from given food sample.	
<b>14</b>	Analysis of Acid soluble compound from given food sample.	
<b>15</b>	Analysis of Acid insoluble compound from given food sample.	
<b>16</b>	Industrial visit	<b>02</b>
<b>17</b>	Total	<b>06</b>

**References**

1. Industrial Microbiology: M, J. Waites, N. L. Morgan, J. S. Rockey, G Higton.
2. Food Bio- Chemistry And Processing: B. J. Simpson.



**COURSE:- FOOD PROCESSING (DAIRY MILK)****SEMESTER –IV PAPER – XXII FPT 22****FOOD ENGINEERING (THEORY)****Marks 50****Credits 03**

<b>Sr. No.</b>	<b>Topics</b>	<b>Lectures</b>	<b>Credit</b>
1.	RHEOLOGY OF PROCESSED FOOD, 1.1 properties of fluid foods, 1.1.1 Rheological method, 1.2 Measurement of rheological parameters, 1.2.1 properties of granular food and powders, 1.3 Properties of solids foods, 1.3.1 Visco-elastic models. 1.3.2 Measurement of food texture.	7	<b>03</b>
2.	FOOD FREEZING: 2.1 Thermal properties of frozen foods. 2.2 Prediction of freezing rates. Plank's equation, 2.3 Neumann problem and Tao solution. 2.4 Design of food freezing equipment, 2.5 Air blast freezers, 2.6 Plate freezers and immersion freezers, storage of frozen foods.	7	
3.	FOOD DEHYDRATION: 3.1 Estimation of drying time for food products, constant rate period and falling rate period dehydration. 3.2 Diffusion controlled falling rate period. 3.3 Use of heat and mass balanced in analysis of continuous dryers,	7	
4.	FIXED TRAY DEHYDRATION, 4.1 cabinet drying, 4.2 tunnel drying. 4.3 Freeze Dehydration: Heat and mass transfer, Calculation of drying times, Industrial freeze drying.	3	
5.	STUDY OF FOOD EQUIPMENT 5.1 pulping, Fruit juice extraction, 5.2 Blanching, Dehulling, 5.3 Size reduction and distillation. 5.4 Equipment used for food processing such as mixing, evaporator, heat exchanger, centrifugation and pumping.	14	
6.	Process time calculation using D, Z and F value.	7	
7.	Total	45	

**COURSE:- FOOD PROCESSING (DAIRY MILK)**

**SEMESTER –IV PAPER – XXIII FPP 23**

**FOOD ENGINEERING (PRACTICAL)**

**Marks 100 Credits 06**

<b>Sr. No</b>	<b>Name of Practical</b>	<b>Credits</b>
1	Study of mechanism of different parts of freezers	<b>04</b>
2	Study of freezers and freeze dryers	
3	Design problems on batch freezers	
4	Design problems for continuous freezers	
5	Design problems on dryer	
6	Study of importance of freezer and dryer	
7	Study of rheological properties of foods.	
8	Sieving and size reduction Operation	
9	Study of mechanism of milk tester	
10	Study of Principle and mechanism of centrifuge machine	
11	Centrifugation of different food product	
12	Study centrifugation of Milk.	
13	Study of Food plant design	
14	Study of Food plant Layout.	
15	Engineering drawing.	
16	Visit to dairy industry.	<b>02</b>
17	Total	<b>06</b>

**References**

1. Agricultural And Food Marketing Management: I. M. Crowford.
2. Cereal Processing Technology: G. Owens.
3. Fruits And Vegetable Processing: M.E.Dauthy.
4. Packaging Technology:G. A. Giles.

**COURSE:- FOOD PROCESSING (DAIRY MILK)**

**SEMESTER – IV PAPER – XXIV FPT 24**

**FOOD AND INDUSTRIAL LAWS (THEORY)**

**Marks 50 Credits 03**

<b>Sr. No.</b>	<b>Topics</b>	<b>Lectures</b>	<b>Credit</b>
1	INTRODUCTION 1.1 To subject, Need of enforcing the laws and various types of laws.	04	<b>03</b>
2	MANDATORY FOOD LAWS; 2.1The food safety and standards bill 2005, 2.2Establishment of the authority, composition of authoring functions of chief executive officer, scientific part,	10	
3	GENERAL PRINCIPLES 3.1to be followed in administration of act, 3.2 General provisions as to articles of food, special responsibility as to safety of food, analysis of food offences of penalties.	4	
4	MANDATORY ACTS OF FOOD PROCESSING 4.1Standard weight of measure act, essential commodity act, consumer protection act, 4.2Environmental protection act insecticide act. 4.3Export (quality control & inspection) act.	5	
5	THE COMPANIES ACT, 1956 5.1Company-Definition, Meaning, Features and Types of Companies, 5.2Incorporation of a Company-Mode of forming ,Documents to be filed with registrar, Certificate of Incorporation, Effects of Registration, Memorandum of Association-Its contents and alteration, Doctrine of Ultra Vires 5.3Article Of Association- Its contents and alteration- Comparison between Articles and Memorandum, Prospectus- Registration and contents Statement in lieu of Prospectus	8	
6	THE INDUSTRIAL DISPUTES ACT,1946 & THE FACTORIES ACT 1948: 6.1 The Industrial Disputes Act,1946 - 6.2 Definitions, Authorities under the Act, 6.3 Power & Duties of Authorities, Strike & lockout, 6.4 Lay-off ,retrenchment, closure and dismissal, 6.5 Grievance Redressal Machinery, Penalties 6.6 The Factories Act, 1948 - Definitions, Authorities, Provisions regarding Safety, Provisions regarding Health, Provisions regarding Welfare, Provisions regarding Leave with Wages, 6.7 Provisions regarding Working hours of adults, Penalties.	10	
7	OPTIONAL FOOD STANDARDS; 7.1Scope, Need and Procedure to obtain- HACCP, ISO, 7.2Agmark	3	
8	SEMINARS, WORKSHOP, GROUP DISCUSSION	1	
9	Total	45	

**References**

1. Food Processing: Principle And Applications: J.S. Smith, H. Y. Hui.
2. Agricultural And Food Marketing Management: I. M. Crowford.

**COURSE:- FOOD PROCESSING (DAIRY MILK)  
SEMESTER – IV PAPER – XXV FPT 25**

**DAIRY TECHNOLOGY MANAGEMENT (THEORY)**

**Marks 50                  Credits 03**

Sr. No.	Topics	Lectures	Credit
1.	Introduction of Dairy Technology 1.1 Milk composition 1.2 Nutritional importance of milk 1.3 Reception of milk and platform tests	6	<b>03</b>
2.	Introduction of Standardization 2.1 Define Standardization 2.3 sterilization of milk	6	
3.	Introduction of Pasteurization 3.1 Pasteurization of milk 3.2 Pasteurization methods	5	
4.	Introduction Homogenization of milk 4.1 Define Homogenization of milk	5	
5.	Post mulching techniques 5.1 Chilling 5.2 storage 5.3 marketing of milk	5	
6.	Indigenous milk products 6.1 Classification Indigenous milk products 6.2 Composition Indigenous milk products	5	
7.	Quality management standard and system 7.1 BIS/ISI standards 7.2 PFA rules,	5	
8.	Quality management standard and system, 8.1 AGMARK, 8.2 HACCP, 8.3 FSSAI .	8	
9.	Total	45	

**References**

1. Milk and milk products----- Eckles, Comb and Mary
2. Milk and milk products ---- Harbousing and Moore
3. Modern Dairy Products----- by Lampert
4. Dairy India Year Book – 2007 by - P.R. Gupta
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.

**COURSE:- FOOD PROCESSING (DAIRY MILK)  
SEMESTER – IV PAPER –XXVI FPP 26**

**DAIRY TECHNOLOGY MANAGEMENT (PRACTICAL)**

**Marks 100 Credits 06**

Sr No	Name of practical	Credits
1	Quality Evaluation Of Milk Platform Tests	<b>04</b>
2	Preparation Of Ice-Cream	
3	Preparation Of Rosogulla	
4	Preparation Of Shreekhand	
5	Preparation Of Khoya	
6	Preparation Of Kulfi	
7	Preparation Of Curd	
8	Examination & Adulteration Test Ghee	
9	Determination Of Fat And SNF Of Milk	
10	Detection Of Adulteration In Food Products	
11	Determination Of Specific Gravity Of Milk	
12	Standardization Of Milk & Milk Products	
13	Examination Of Casein From Milk	
14	Texture Analysis Of Food	
15	Determination Of Viscosity By Viscometer	
16	Visit To Quality Control Laboratory Milk Processing Industry	<b>02</b>
17	Total	<b>06</b>

**References**

- 1.Milk products in India----- M.R. Shrinivasan & C.P.Anantkrishnan.
- 2.Dairy Technology and Engineering by H.G. Kessler
- 3.Ice-Cream----- by W. S. Arbuckle
- 4.Dairy Processing by Earl.
- 5.Technology of Indian milk products—by R.P.Aneja, B.N.Mathur,

**COURSE:- FOOD PROCESSING (DAIRY MILK)  
SEMESTER – IV PAPER – XXVII FPT 27**

**FOOD PACKAGING (THEORY)**

**Marks 50**

**Credits 03**

<b>Sr. No.</b>	<b>Topics</b>	<b>Lectures</b>	<b>Credit</b>
1.	INTRODUCTION, 1.1 Importance of Packaging, 1.1 Importance of Packaging, 1.3 Packaging materials, a) Characteristics of basic packaging materials: Paper (paper board, corrugated paper, fibre board), Glass, Metal, Plastics, Foils and laminates, retort pouches, Package forms,	6	<b>03</b>
2.	PACKAGING TECHNIQUE OF MILK AND DAIRY PRODUCTS 2.1pasteurized milk, 2.2 UHT-sterilized milk, 2.3aseptic packaging,	6	
3.	STUDY OF FAT RICH PRODUCTS 3.1 ghee and butter, 3.2 coagulated and desiccated indigenous dairy products and their sweet mades, 3.3 concentrated and dried milks including baby foods.	6	
4.	MODERN PACKAGING TECHNIQUES; 4.1 Vacuum Packaging, 4.2 Modified atmosphere packaging (MAP), 4.3 Eco- friendly packaging, 4.4 Principles and methods of package sterilization, edible packaging.	10	
5.	CODING AND LABELLING OF FOOD PACKAGES, 5.1 Aseptic Packaging (AP), 5.2 Scope of AP and pre-requisite conditions for AP, 5.3 Description of equipments (including aseptic tank) and machines-	6	
6.	STUDY OF MICRO-PROCESSOR CONTROLLED SYSTEMS 6.1 Importance for AP, 6.2 Package conditions and quality assurance aspects of AP, 6.3Microbiological aspects of packaging materials. 6.4 Disposal of waste package materials, 6.5 Packaging Systems	8	
7.	.Seminars, Workshops, Group discussion	3	
8	Total	45	

**References**

1. Packaging Technology:G. A. Giles

2. Food Processing: Principle And Applications: J.S. Smith, H. Y. Hui.

**COURSE:- FOOD PROCESSING (DAIRY MILK)  
SEMESTER – IV PAPER – XXVIII FPP -28**

**FOOD PACKAGING (PRACTICAL)**

**Marks 100 Credits 06**

<b>Sr No</b>	<b>Nmae of practical</b>	<b>Credits</b>
<b>3</b>	Measurement of thickness of paper, paper boards.	<b>04</b>
<b>4</b>	Measurement of basis weight of paper and paperboards.	
<b>5</b>	Measurement of grammage and water absorption of paper, paper boards.	
<b>6</b>	Measurement of bursting strength of paper of paper boards. Measurement Tear resistance of papers.	
<b>7</b>	Measurement of puncture resistance of paper and paperboard.	
<b>8</b>	Measurement of tensile strength of paper of paper boards.	
<b>9</b>	Measurement of grease resistance of papers	
<b>10</b>	Determination of gas transmission rate of package films. Determination of WVTR and QTR of films.	
<b>11</b>	Determination of coating on package materials. Identification of plastic films.	
<b>12</b>	Finding chemical resistance of films.	
<b>13</b>	Re- packaging practices followed for packing fruits, vegetables.	
<b>14</b>	Packaging of different dairy products by using Pre pack and Vacuum packaging machines.	
<b>15</b>	Preparation of Packaging Album.	
<b>16</b>	Industrial Visits	
<b>17</b>	Total	<b>06</b>

**References**

- 1.Industrial Law - P.L. Malik
- 2.Business and Commercial Laws-Sen and Mitra.
- 3.An Introduction to Mercantile Laws-N. D. Kapoor

## List of Reference Books:

1. A Text book of Animal Husbandry by - G.C. Banarjee
2. Milk and milk products----- Eckles, Comb and Mary
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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.
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- by W. S. Arbuckle
12. Dairy Processing by Earl.
13. Technology of Indian milk products—by R.P. Aneja, B.N. Mathur,
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A.K. Banerjee.
15. Introduction to food safety-----  
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Dairy Farmers- Patrick John.
19. A Textbook of Genetics----  
- Dalela R. C. & S. R. Verma.
20. Genes and Evolution---  
- JHA
21. Genetics of Live stock improvement----  
- John F. Lesley
22. An Introduction to Genetics----  
B. K. Jain.



**T.Y B.Voc**  
**SYLLABUS WILL BE**  
**IMPLIMENTED**  
**FROM**  
**JUNE 2020-21**

**COURSE:- FOOD PROCESSING (DAIRY MILK)**

**SEMESTER -V PAPER – XXIX FPT 29**

**Traditional Dairy Products-I (THEORY)**

**Marks 50**

**Credits 03**

<b>Sr. No.</b>	<b>Topics</b>	<b>Lectures</b>	<b>Credit</b>
1.	Dairy products 1.1 Introduction t Dairy products	5	<b>03</b>
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 5.1 Kheer 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 30 Traditional Dairy Products-I (PRACTICAL)**

Credits 6 Marks 100

Sr No	Name of Practical	Credits
1	Preparation of Khoa based sweet: barfi, gulabjamun.	<b>04</b>
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	<b>02</b>
17	Total	<b>06</b>

**COURSE:- FOOD PROCESSING (DAIRY MILK)**

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

**Marks 50**

**Credits 03**

<b>Sr. No.</b>	<b>Topics</b>	<b>Lectures</b>	<b>Credit</b>
1.	International requirements for export of milk and milk products	7	<b>03</b>
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	<b>03</b>

**COURSE:- FOOD PROCESSING (DAIRY MILK)**

**SEMESTER –V PAPER – XXXII FTP 32**

**FOOD PROCESSING AND PRESERVATION TECHNOLOGY (THEORY)**

**Marks 50 Credits 03**

<b>Sr. No.</b>	<b>Topics</b>	<b>Lectures</b>	<b>Credit</b>
1.	Sources of food, scope and benefit of industrial food preservation, perishable, non perishable food, causes of food spoilage.	05	<b>03</b>
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	<b>03</b>

**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	<b>04</b>
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	<b>02</b>
17	Total	<b>06</b>

**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	<b>03</b>
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, chivenprash, 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.	<b>04</b>
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 dalmab manuka.	
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	<b>02</b>
17	<b>Total</b>	<b>06</b>



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

**NEW PRODUCT DEVELOPMENT (THEORY)**

**Marks 50**

**Credits 03**

<b>Sr. No.</b>	<b>Topics</b>	<b>Lectures</b>	<b>Credit</b>
1.	New product development 1.1 Need, importance 1.2 Formulation for new product development.	4	<b>03</b>
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	<b>03</b>

**COURSE:- FOOD PROCESSING (DAIRY MILK)**  
**SEMESTER –VI PAPER – XXXVII FPP 37**

<b>Sr No</b>	<b>Name of Practical</b>	<b>Credits</b>
<b>1</b>	<b>Research Project</b>	<b>6</b>

**COURSE:- FOOD PROCESSING (DAIRY MILK)**

**SEMESTER –VI PAPER – XXXVIII FPT 38**

**Farm Animals Breeding (THEORY)**

**Marks 50**

**Credits 03**

Lecture	Topic	Lectures	Credits
1	History and concept of animal breeding	4	<b>03</b>
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	<b>03</b>

**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	<b>03</b>
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**

<b>Sr No</b>	<b>Name of Practical</b>	<b>Credits</b>
1	Analysis of Moisture content from given food sample.	<b>04</b>
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	<b>02</b>
17	<b>Total</b>	<b>06</b>

**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.	<b>Ice-cream:</b> 1.1 Introduction 1.2 Definition 1.3 History of development and status of ice-cream industry.	05	<b>03</b>
2.	composition of ice-cream 2.1 Nutritive value of ice-cream 2.2 Different forms of ice-cream eg. (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.	02	

	7.1 Blast freezers 7.2 Normal freezers		
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 13.2 Malai burfi, 13.3 milk ices and lollies. 13.3 Milk shake.	05	
14.	Total	45	<b>03</b>

**COURSE:- FOOD PROCESSING (DAIRY MILK)**  
**SEMESTER –VI PAPER – XXXXII FPP 42**

**ICE-CREAM & FAT RICH DAIRY PRODUCTS (Practical)**

**Marks 100 Credits 06**

Sr No	Name of practical	Credits
1	Study of ice-cream freezer	<b>04</b>
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	<b>02</b>
17	Total	<b>06</b>

<b>Total Credit</b>	<b>Total Semesters 06</b>	<b>180 Credit</b>
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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
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