Progressive Education Society's

Modern College Of Arts, Science and Commerce, Ganeshkhind, Pune – 411 016

(NEP 2023-24)

Syllabus for

S.Y.B.Voc (Food Processing Technology)

INTRODUCTION

The University Grants Commission (UGC) has launched a scheme on skills development based higher education as part of college education, leading to Bachelor of Vocation (B. Voc.) degree with multiple exits such as Diploma/Advanced Diploma under the National Skill Qualification framework (NSQF). The B. Voc. Programme is focused on providing undergraduate studies which would also incorporate specific jobs and their NOSs (National Occupational standards) along with broad based general education. This would enable the graduates completing B. Voc. to make a meaningful participation in accelerating India's economy by gaining appropriate employment, becoming entrepreneurs and creating appropriate knowledge.

Under National Skills Development Corporation, many Sector Skill Council representing respective industries have/are being established. One of the mandates of Sector Skill Councils is to develop National Occupational Standards (NOSs) for various jobs in their respective industries. It is important to embed the competencies required for specific jobs roles in the higher education system for creating employable graduates.

This course will identify and fill the skill gaps. The mandate of this program is to create a course with industry-academia collaboration that will produce skilled workforce satisfying specific needs of the industry. This course will offer multiple needs of the industry. The structure will allow offer multiple needs of the industry. The structure will allow students to have thorough theoretical knowledge coupled with rigorous hands on training in both laboratory and industry.

Unique Features of the Course:

- The skill development component is to equip students with appropriate knowledge, practice and attitude, so they are ready to work.
- The skill development components will be relevant to the industries as per their requirements.
- The curriculum is embed with National Occupational Standards (NOSs) of specific job roles within the industry sector(s).
- The overall design of the skill development component along with technologies in food process engineering.
- The curriculum should also focus on work-readiness skills in each of the three years. Curriculum should also focus on work-readiness skills in each of the three years. Curriculum is designed to match industrial needs with greater emphasis on pratical work,

on the job training and industrial internship.

Program Objectives:

- To provide judicious mix of skills relating to a profession and appropriate content of General Education.
- To ensure that the students have adequate knowledge and skills, so that they are ready to work at each exit point of the programme.
- To provide flexibility to the students by means of pre-defined entry and multiple exit points.
- To integrate NSQF within the undergraduate level of higher education in order to enhance employability of the graduates and meet industry requirements. Such graduates apart from meeting the needs of local and national industry are also expected to be equipped to become part of the global workforce.

Suggested internal assessment tools for courses:

The concerned teacher shall announce the units for which internal assessment will take place. A teacher may choose one of the methods given below for the assessment.

1. Library notes
2. Students Seminar
3. Short Quizzes / MCQ Test
4. Home Assignments
5. Tutorials/ Practical
6. Oral test
7. Research Project
8. Group Discussion
9. Open Book Test
10. Written Test
11. PPT presentation
12. Industrial Visit
13. Viva

Teaching Methodology:

1. Classroom Teaching
2. Guest Lectures
3. Group Discussions
4. Surveys
5. Power Point Presentations
6. Visit to Industries
7. Research Papers & Projects
8. E-content

Subject List

S.Y.B.Voc (Food Processing Technology) Sem III

S.Y.B.Voc (Food Processing Technology) Minor (Dairy Technology) Semester III					
	Subject Name	**Credits**		**Evaluation**	
		Th	**Pr**	**CIE**	**SEE**
Major	BVO23101:Post Harvest management of fruit and vegetables	2	-	20	30
	BVO23102: Food Analysis	2	-	20	30
	BVO23103: Pr. on Post Harvest Technology	-	2	20	30
	BVO23104: Pr. on Food Analysis (2) (P)	-	2	20	30
Minor	BVO23205: Industrial Dairy Technology	2	-	20	30
	BVO23206: Practical on Industrial Dairy Technology	-	2	20	30
Open Electives	Offered by Arts/Commerce	2	-	20	30
VSC, SEC (VSEC) Skill Based	BVO23408 Practical on Food Preservation	-	2	20	30
AEC, VEC, IKS	English	2	-	20	30
FP/CC/OJT/CEP	NSS / NCC/ Cultural / Performing Arts/Sports	-	2	20	30
	BVO23611: Field Survey	-	2	20	30

S.Y.B.Voc (Food Processing Technology) Minor (Dairy Technology) Semester IV					
	Subject Name	**Credits**		**Evaluation**	
		Th	**Pr**	**CIE**	**SEE**
Major	BVO24101:Spices Technology	2	-	20	30
	BVO24102: Food Packaging Technology	2	-	20	30
	BVO24103:Indian Traditional Food	2	-	20	30
	BVO24104: Pr. on Food Packaging	-	2	20	30
Minor	BVO24205: Milk and Milk Products Technology	2	-	20	30
	BVO24206: Pr. On Milk and Milk Products (P)	-	2	20	30
Open Electives	Offered by Arts/Commerce	-	2	20	30
VSC, SEC (VSEC) Skill Based	BVO24408 Practical on Food Safety and Hygiene	-	2	20	30
AEC, VEC, IKS	Marathi	2	-	20	30
FP/CC/OJT/CEP	NSS / NCC/ Cultural / Performing Arts/Sports	-	2	20	30
	BVO24611:CEP	-	2	20	30

Credit Allocation: - CC-Core Course, EC-Elective Course, PR-Practical, PJ-Project, AECC-Ability Enhancement Compulsory Courses, SEC-Skill Enhancement Courses.

Total - Credits for First years Programme.

S.Y.B.Voc (Food Processing Technology)

BVO23101: Post Harvest management of fruit and vegetables (2credits)

Total lectures: 30 **Total Credits: 2**

Course Outcome:-

1. Students will understand about different preservation techniques and its role in food industry.
2. They will learn about processing of different fruits and preservation by preparation of different beverages, like RTS, squash, cordial, nectar, concentrate and fruit powder
3. They will learn processing of jam, jelly, marmalade and defects in preparation of products.
4. They will get knowledge about drying and dehydration of fruit and vegetable.
5. They will learn processing of tomato and different tomato products.

Sr. No.	Topic	Lectures (30L)
1.	Introduction 1. Importance of fruits and vegetables 2. Classification of fruits and vegetables 3. History and need of preservation, Reasons of spoilage 4. Current status of production and processing of fruits and vegetables. Structural, compositional and nutritional aspects. 5. Methods of preservation (short and long term)	05
2.	Canning and bottling of fruits and vegetables 1. Selection of fruits and vegetables 2. Process of canning 3. Factors affecting the process: time and temperature 4. Containers for packing 5. Lacquering 6. Syrups and brines for canning 7. Spoilage of canned foods	05
3.	Fruit beverages 1. Introduction 2. Processing of fruit juices (selection, juice extraction, deaeration, straining, filtration, clarification and bottling 3. Preservation of fruit juices (pasteurisation, chemical preservation with sugars, freezing, drying, tetra packing, carbonation) 4. Processing of RTS, cordials, nectars, squashes, concentrates and powders.	05
4.	Jams, Jellies and marmalades 1. Jams: constituents, selection of fruits, processing technology, defects 2. Jelly : essentials of constituents (role of pectin and ratio), theory of jelly formation, processing and technology, defects 3. Marmalades: types, processing technology, defects	05
5.	Pickles, chutney and sauces 1. Types 2. processing technology causes of spoilage	05
6.	Tomato products 1. Introduction 2. Selection of tomatoes 3. pulping and processing of different tomato products- tomato puree, sauces, ketchup, soup and paste	05

References:

1. Food science by B.Srilakshami;New Age International.
2. Fundamentals of Foods and Nutrition by R. Madambi& M.V. Rajgopal.
3. Foods :Facts and Principles by N Shakuntalamanay;New Age International (P) Ltd.
4. Preservation of Fruits and Vegetable by Girdharilal and Sidappa; CBS Publications
5. Food Science and Processing Technology,Vol., 2 by Mridula and Sreelata
6. Food Preservation by Sandeep Sareen
7. Fruit and Vegetable Preservation by Shrivastava and Kunal.
8. Post-Harvest Physiology & Handling of Fruits & Vegetables by Wills, Lee, Graham, Mc Glasson& Hall (AVI)
9. Literature from Spice Board of India, etc.
10. Girdharilal, Siddappaa, G.S and Tandon, G.L., Preservation of fruits &Vegetables, ICAR, New Delhi, 1998
11. W B Crusess. Commercial Unit and Vegetable Products, W.V. Special IndianEdition, Pub: Agrobios India
12. Manay, S. &Shadaksharaswami, M., Foods: Facts and Principles, New AgePublishers, 2004

S.Y.B.Voc (Food Processing Technology)

BVO23102: Food Analysis

Total lectures: 30 **Total Credits: 2**

Course Outcome:

1. They will learn different physical, chemical and rheological properties of foods.
2. Students will understand the techniques of food analysis viz. gravimetric colorimetric, chromatographic with their working principles and application.
3. They will acquire knowledge about sensory attributes, facilities for sensory evaluation sensory evaluation methods of food.
4. They will learn about sampling procedure and types of sampling, its uses for sensory evaluation,
5. They will learn about proximate analysis of foods and different instruments application.

Chapter No	Content	Lectures (30L)
1.	Introduction to Food Analysis- Food composition and Factors affecting food composition. Physical properties: Colour, viscosity, size and shape: & Chemical properties of foods	**5**
2.	Sampling techniques; Sample collection and preparation for analysis, Evaluation of GRAS aspect of food additives;	**5**
3.	**p**H meter : Theory, Principle, types and application Moisture Meter: Theory, Principle, types and application Centrifuge : Theory, Principle, types and application Methods of analysis: Proximate constituents: Total fat, crude fiber, protein, moisture, minerals analysis; adulterations	**5**
4.	Spectroscopic analysis- Principle, instrumentation & application Colorimetric (colorimeter), Titrimetric analysis : Principle, types and application Gravimetric analysis : Principle, types and application Chromatographic techniques : Principle, types and application	**5**
5.	Sensory attributes of foods: mechanisms of sensation and perception of colour, taste, odour, and flavour; importance and use of sensory evaluation, methods of sensory evaluation, facilities	**5**

	required for sensory evaluation. Shelf life study of foods.	
6.	Analysis of sensory data; Statistical testing; correlating instrumental and sensory measurements. Nutritional labelling of foods.	**4**

References:

1. A. V. Sathe, A First Course in Food Analysis, New Age International Pvt. Ltd. 1999
2. S. S. Nielsen, Food Analysis, 3rd ed., Kluwer Academic Publishers, 2003
3. S. S. Nielsen, Food Analysis Laboratory Manual, Kluwer Academic Publishers, 2003
4. R.Wood, L.Foster, A.Damant and P.Key, Analytical Methods for Food Additives, Wood head Publishing, 2004
5. Y. Pomeranz and C.E.Meloan, Food Analysis: Theory and Practice, 3rd ed., Chapman & Hall, 1994
6. AOAC, Official Methods of Analysis and AOAC International, 2005
7. R.E.Wrolstad, T.E. Acree, E.A.Decker, M.H.Penner and D.S.Reid, Handbook of Food Analytical Chemistry, John Wiley & Sons, 2004

S.Y.B.Voc (Food Processing Technology)

BVO23103: Practical on Post-Harvest management of fruit and vegetables

Course Outcomes:

1. They will understand the preservation of fruits and vegetable by pickling.
2. They will learn to preserve the fruit by sugar by preparing squash.
3. Students will understand the drying of fruit and vegetables
4. They will understand processing of different fruit and vegetable products like jam, jelly, squash, mango bar, tomato ketchup.
5. They will acquire knowledge about sensory evaluation, sensory evaluation of processed product.
6. They will learn to control the enzymatic browning in fruit and vegetables by using different method like blanching, salt solution, acid solution, normal water solution, refrigeration

S.No.	Post - Harvest management of fruit and vegetables (2 credits)	Practical (15P)
1.	Quality parameter evaluation of fresh fruit and vegetable.	1 P
2.	Controlling enzymatic browning in fruit and vegetable	1 P
3.	Asses the adequacy of blanching.	1 P
4.	Pre-treatment and drying of fruit and vegetable	1 P
5.	Experiment on dried product quality evaluation.	1 P
6.	Preparation of mixed fruit jam	1 P
7.	Preparation of jellies	1 P
8.	Preparation of RTS, squash	2 P
9.	Preparation of sauce and ketchup	2 P
10.	Carry out the preservation of fruits and vegetables by pickling	1 P
11.	Sensory evaluation of processed products.	1 P
12.	Osmotic dehydration of fruits and vegetables.	1 P
13.	Examination of canned pineapple.	1 P

S.Y.B.Voc (Food Processing Technology)

BVO23104: Practical on Food Analysis

S.No	Practical on Food Analysis (2 Credits)	Practical (15P)
1.	Physical examination of various food grains	1
2.	Experiments on fat tests.	1
3.	Quality analysis of water	1
4.	Separation and identification of amino acids by paper chromatography and TLC	2
5.	Determination of total ash content in food products. Preparation of ash solution for mineral estimation.	1
6.	Determination of Titratable acidity and pH of fruit juice	1
7.	Determination of impurities of oil samples	1
8.	Free fatty acids in fats and oils	1
9.	Qualitative analysis of Carbohydrates and Amino acids	2
10.	Determination of protein in foods	1
11.	Determination of Reducing Sugars	1
12.	Qualitative detection of adulterants in Atta, Maida, Besan, Biscuit, Black pepper, Butter, Ghee, Chilli Powder, Honey, Tea, Turmeric powder, soft drink	1

S.Y.B.Voc (Food Processing Technology)

BVO23205: Industrial Dairy Technology

Course Outcomes:

1. Student will study different status of dairy industry in India.
2. Student will get idea regarding different processing stages involved in dairy industry.
3. Students will learn different types of equipment used in Diary industry.
4. Students will learn regarding Effluent system, hygiene and sanitation.

Sr. No.	Topic	Lectures (30L)
1.	**Dairy Development in India** NDDB, NDRI, Military dairy farm, IDC, Dairy Co-operatives, Milk Grid, Operation Flood.	05
2.	**Dairy Processing** Clarification: Clarifier and clarification of milk, working principle Pasteurization: History, Pasteurizers (Plate heat exchanger, shell and tube heat exchanger) Cream separator: Working Principle, Applications Homogenization: Single & double stage homogenization, theory of homogenization, Homogenizer valve, homogenization efficiency Sterilization: Bottle, UHT, aseptic packaging	08
3.	**Filling, Mixing and Agitation Equipments:** Operation Principle, Working Principle of different types of filling machine, Mixing and agitation, Power consumption of Mixer, Selection of Mixing Equipment in dairy industry.	05
4.	**Water Supply and Dairy Effluent System:** Tube well, water storage and supply, Water quality water treatments and purification, Waste water treatment, reuse and disposal, Water conservation and rain water harvesting	05
6.	**Dairy Engineering** Cleaning & Sanitation : Cleaning agents, CIP & COP Working & maintenance of can washer, crate washer and bottle washer Sanitary milk pump & fittings, types of pumps Refrigeration: Vapour compression refrigeration cycle, common refrigerants, properties of good refrigerants Dairy Plant layout : Selection of site, layout of liquid and composite milk plant	07

Refernces:

1. Outlines of Dairy Technology by Sukumar De.
2. Dairy Processing by Earl.
3. Dairy Technology and Engineering by H.G. Kessler
4. Dairy Plant Engineering and Management by Tuffel Ahmed.
5. Textbook of Dairy Plant Layout & Design by Lalat Chander, I.C.A.R. publication.
6. Principles of Dairy Chemistry by Jenners and Pattorn.
7. Dairy Chemistry by M.M. Rai.
8. Dairy Microbiology by K.C. Mah

S.Y.B.Voc (Food Processing Technology)

BVO23206: Practical on Industrial Dairy Technology

Sr. No	**Practical on Industrial Dairy Technology (2c)**	Practical (15P)
1	Determination of specific gravity of milk	1
2	Determination of moisture content present in milk and milk product	2
3	Determination of Acidity and PH of milk and milk product	2
4	Determination of fat test of milk, Determination of SNF and TS of milk	2
5	Methylene blue reduction (MBR) test	1
6	Detection of Adulterants and preservatives in milk	1
7	Platform test. i) Organoleptic test ii) Temperature iii) C.O.B. test iv) Alcohol test v) Sediment test	2
8	Determination of FFA present in ghee and Butter	1
9	To calculate casein percentage in milk	1
10	Determination of ash content present in milk	1
11	Estimation of salt content in butter sample	1

S.Y.B.Voc (Food Processing Technology)

BVO23408: Practical on Food Preservation

S.No.	Practical on Food Preservation (2 credits)	Practical (15P)
1.	Carry out preservation of certain vegetables by dehydration	1 P
2.	Study the re-hydration characteristics of dried vegetable.	1 P
3.	Carry out the preservation of fruits and vegetables by pickling	1 P
4.	Asses the adequacy of blanching.	1 P
5.	Perform osmotic dehydration of certain fruits and vegetables by sugar and salt solution.	1 P
6.	Study different parameters during processing of rice e.g. cooking time, %elongation, % width, expansion, %water uptake, CDC ratio.	1 P
7.	Preparation of squash to demonstrate the preservation by sugar.	1 P
8.	Bottling of peas.	2 P
9.	Preservation of vegetable with the help of fermentation technique (sauerkraut)	2 P
10.	Examination of canned pineapple.	1 P
11.	Carry out shelf life study of egg by using different preservation methods.	1 P
12.	Identification of different types of packaging material used in the food industry.	1 P

S.Y.B.Voc (Food Processing Technology)

BVO24101: Spices Technology (2 Credit)

Course Outcomes:

1. Students will understand the basic concepts, Production and processing scenario of spices, flavour & plantation crops and its scope in India.
2. They will understand the Major and Minor spices, herbs and leafy vegetables: processing and utilization.
3. They will understand about Spice oils, packaging of spices and processing of spice products, Separation, purification and identification of natural flavoring.
4. They will know Standards specification of spices and flavors.

Chapter No.	Topics	Lectures (30L)
1	Production and processing scenario of spices, flavour & plantation crops and its scope	04
2	Major Spices: (1) Post Harvest Technology composition, processed products of following spices (2) Ginger (3) Chilly (4) Turmeric (5) Onion and garlic (6) Pepper (7) Cardamom (8) Cashew nut	06
3	Minor spices, herbs and leafy vegetables: processing and utilization, All spice, Annie seed, sweet Basil, Caraway seed, Cassia, Cinnamon, Clove, Coriander, cumin, Dill seed Fern seed nutmeg mint marjoram, Rose merry, saffron, sage, thyme, Ajowan, Curry leaves, Asafoetida	05
4	Spice oils and oleoresins packaging of spices and spice products, Functional packaging of spices and spice products By-products of plantation crops and spices	5
5	Overview on flavouring compounds used in Food, Synthetic flavouring agents and their stability (Wines, spirits, MSG and vinegars)	5
6	Flavour Flavours of minor spices; Flavour of major spices , Flavours of soft drinks, Baking and confectionery industry Natural flavouring agents and their stability(Vanilla, Cocoa beans, Olive oil, mustard oil and walnut oil)	05

Reference:

1. Spices and Plantation Crops K.G. Shanmugavelu Agrotech Publication, Delhi
2. Spice and Condiments Pruthi J.S. National Book Trus, 1996

S.Y.B.Voc (Food Processing Technology)

BVO24102: Food Packaging Technology

Course Outcome:

1. Students will understand basic concepts of food packaging, shelf life and evaluation of packaging.
2. They will learn about methods of packaging and types of packaging materials.
3. They will understand about legal and management aspects of packaging.
4. Evaluation of quality and safety of packaging materials and different testing procedures

Sr No.	Topics	Lectures (30L)
1	**Introduction To Packaging** Introduction- evaluation of packaging- economics- packaging operations- packaging terminology. Need of packaging, Hazards in distribution- functions of package- design of packages for various foods.	4
2	**Packaging materials:** Classification of packages, Paper (corrugated and paper board boxes etc.), Glass, Metal, Aluminium and as package material its manufacture, types, advantages, disadvantages, plastic as package material, classification of polymers, properties, uses and chemistry of each plastic such as polyethylene, polypropylene, polystyrene, polycarbonate, PVC, PVDC, cellulose acetate, nylon. Lamination, need of lamination, types, properties, advantages & disadvantages.	8
3	**Special packaging methods-** MAP, CAP, Vacuum and gas packaging, shrink package, retort pouches- Bio degradable packages. Permeability – theoretical consideration permeability of gases and vapours, permeability of multilayer packages, permeability in relation to products.	5
4	**Canning Operations** Canning of food products- types of cans- open top sanitary cans- tin plate grades- lacquering and sealing compounds for OTS cans- canning operations- can washing and sterilization- exhausting- seaming- reforming and flanging operations- retorting of cans.	4
5	**Selection Of Packaging Materials**	4

	Special problems of packaging food stuffs- packaging of various foods- compatibility- toxicity- packaging equipments- packaging standards and regulations.	
6	**Legal And Management Aspects Of Packaging** Laws and policies behind packaging, safety and legislative aspects of packaging. Testing and evaluation of packaging media- retail packs (including shelf life evaluation)and transport packages, Food marketing and role of packaging, packaging Aesthetic and graphic design, labelling in packages, coding and marking including bar coding.	5

REFERENCE BOOKS

1. Sachrow & Griffin, "Food packaging"
2. Heiss R., "Principles of food packaging"
3. Paine E.A, "Fundamentals of packaging".
4. Day P.T., "Packaging of food beverages"
5. Brody AL, "Flexible packaging of Foods"
6. Gordon L. Robertson Food Packaging principles & practice, New york, Marcell DekkerInc.
7. Ronald H. Schmidt Gary E. Roderick Handbook of Food packaging, Food safety Technology by NIIR Board of consultants & Engineers
8. Bureau of G and Multon J.K Food Packaging technology, (Vol.1 and 2) – VCH publishers, INC, New York.
9. Kadoya, T. (1994), Food Packaging, Academic Press, New York

S.Y.B.Voc (Food Processing Technology)

BVO24103: Indian Traditional Food

Course Outcomes (COs):

1. Gain knowledge on diversities of foods and food habits of India
2. Understand the patterns in India with focus on traditional foods.

Sr. No.	Topics	Lectures (30L)
1.	**Introduction:** 1. Traditional methods of milling grains – rice, wheat and corn – equipments and processes as compared to modern methods. 2. Equipments and processes for edible oil extraction, paneer, butter and ghee manufacture – comparison of traditional and modern methods. 3. Energy costs, efficiency, yield, shelf life and nutrient content comparisons. 4. Traditional methods of food preservation – sun-drying, osmotic drying, brining, pickling and smoking.	6
2.	**Traditional Food Patterns** A. Typical breakfast, meal and snack foods of different regions of India. B. Regional foods that have gone Pan Indian / Global. C. Popular regional foods; Traditional fermented foods, pickles and preserves, beverages, snacks, desserts and sweets, street foods. 1. Classification of Food Based on Nature 2. Classification of Food Based on Vargas 3. Classification of Foods Based on Nutrients	8
3.	**Regional Influences on Indian Food** A. Comparison of traditional foods with typical fast foods / junk foods – cost, food safety, nutrient composition and bioactive components. B. Energy and environmental costs of traditional foods; traditional foods used for specific ailments /illnesses.	6
4.	**Factors affecting on Food habits** 1. Factors that affect eating habits in different parts of the country Geographic location 2. Historical background Seasonal availability Special equipment, 3. Staple diets, Specialty cuisine for festivals and special occasions	6
5.	**Health Aspects of Traditional Foods** D. IPR issues in traditional foods	4

REFERENCE BOOKS:-

1. Sen, Colleen Taylor Food Culture in India Greenwood Press, 2005.

2. Davidar, Ruth N. Indian Food Science: A Health and Nutrition Guide to Traditional Recipes: East West Books, 2001.

S.Y.B.Voc (Food Processing Technology)

BVO24104: Practical on Food Packaging Technology

Course Outcomes:

1. Students will understand about Identification of different types of packaging and packaging materials and measurement of thickness of packaging materials.
2. They will learn about performing destructive and non-destructive test on glass container.
3. They will study determination of shelf life of packaged foods and determination of ERH of foods.
4. They will learn about recent trends in food packaging.

Sr. No.	Topic	Practical (15P)
1.	Identification of different types of packaging and packaging materials	**1**
2.	Determination of tensile strength of given material	**1**
3.	Performing destructive and non-destructive test on glass container: determination of wax weights,	**1**
4.	Determination of bursting strength	**1**
5.	Determination of WVTR of packaging materials	**1**
6.	Measurement of thickness of packaging materials;	**1**
7.	Determination of drop test of food packages	**1**
8.	Pre-packaging practices followed for packing of fruits and vegetables	**1**
9.	Study on nutritional labelling of different food materials.	**2**
10.	Study of vacuum packaging machine, bottle filling machine and form-fill-seal machine	**2**
11.	Shelf life calculations for food products in different packaging materials	**1**
12.	Introduction to students with the latest trends in packaging consulting the websites and magazines	**2**

S.Y.B.Voc (Food Processing Technology)

BVO24205: Milk and Milk Products Technology (T)

Course Outcomes:

1. Students will regarding different milk and milk products.
2. Students will understand processing methods for special milks.
3. Students will learn processing techniques for dried milk and Dried milk products.
4. Students learn about by products of dairy industry.

Sr. No.	Topics (2c)	Lectures (30L)
1	**Introduction and special milks:** Definition of Milk, Composition of milk, Types of Milk, Pasteurised milk, sterilized milk, homogenised milk, flavoured milk, standardized milk, constituted milk, recombined milk, tonned milk and double tonned milk	06
2	**Cream and Butter:** Definition, classification, composition, nutritive value, processing and defects	04
3	**Cheese:** Definition, classification, composition, nutritive value, types, processing and defects	04
4	**Dried milk and dried milk products:** Introduction, definition, objects of product, composition, nutritive value, processing and defects (WMP, SMP, Buttermilk powder, Whey powder, Cream powder, Butter powder, Cheese powder, Shrikhand powder, Khoa powder)	08
5	**Ice-cream:** Introduction, definition, classification, composition, nutritive value, types, processing and defects	04
6	**By products:** Introduction, definition, classification, composition and principle of utilization	04

REFERENCE BOOKS:-

1. Outlines of Dairy Technology by Sukumar De.
2. Dairy Processing by Earl.
3. Dairy Technology and Engineering by H.G. Kessler
4. Dairy Plant Engineering and Management by Tuffel Ahmed.
5. Textbook of Dairy Plant Layout & Design by Lalat Chander, I.C.A.R. publication.
6. Principles of Dairy Chemistry by Jenners and Pattorn.
7. Dairy Chemistry by M.M. Rai.
8. Dairy Microbiology by K.C. Mah

S.Y.B.Voc (Food Processing Technology)

BVO24206: Pr. On Milk and Milk Products (P)

Course Outcomes;

1. Student will be able to prepare different types of milks.
2. Student will be able to perform different processing methods used for preparation of various milk products.
3. Students will be able to prepare Ice Creams by using proper processing technologies and also learn regarding defects in ice cream production.3
4. Students will learn about by products in dairy industry.

Sr. No.	Topic	Practical (15P)
1	Preparation of different types of milk (Pasteurized, tonned, double tonned, flavoured milk)	3
2	Preparation of Paneer	1
3	Preparation of Khoa	1
4	Preparation of Pedha	1
5	Preparation of Cheese	1
6	Preparation of Ice-cream	2
7	Preparation of Dhahi and Shrikhand	2
8	Preparation of condensed milk	2
9	Preparation of Ghee and Butter	1
10	By- products of Dairy industry	1

S.Y.B.Voc (Food Processing Technology)

BVO24408 Practical on Food Safety and Hygiene (2) (P)

Course Outcomes:

1. Students will learn how to prepare different types of media.
2. Students learn about different methods of isolation of bacteria.
3. Students learn about bacteriological analysis of water.
4. They will learn about swab test, HACCP and ISO: 22000.
5. They will get introduction regarding biochemical test used for identification of bacteria.

Sr. No.	Content	Practical (15P)
1	Preparation of different types of media (complex, differential and selective)	2P
2	Enumeration of aerial microflora using PDA	2P
3	. Microbiological Examination of different food samples	2P
4	Bacteriological Analysis of Water	1P
5	. Assessment of surface sanitation by swab/rinse method	1P
6	Assessment of personal hygiene	2P
7	Biochemical tests for identification of bacteria	2P
8	Scheme for the detection of food borne pathogens	2P
9	Implementation of FSMS – HACCP, ISO : 22000	1P