Revised Syllabus

BACHELOR OF VOCTIONAL (B.Voc) for Food Processing Technology

Under National Skill Qualification Framework (NSFQ)

Revised Syllabus Copy for
F.Y. B.Voc (Food Processing Technology)

Submitted to

Savitribai Phule Pune University, Pune

By

Progressive Education Society's
Modern College of Arts, Science and Commerce,
Ganeshkhind, Opposite Pune University,
Pune 411016, Maharashtra

Revised Syllabus Draft for First Year

B. Voc. (Food Processing Technology)

Semester - I

Subject Code	Name of the Subject	TH/PR	Credits	Contact Hrs.
FPT01	Food Science	TH	4	60
FPT02	Food Biochemistry	TH	4	60
FPT03	Communication Skills And Personality Development	TH	4	60
FPP01	Practical on Food Science	PR	6	90
FPP02	Practical on Food Biochemistry	PR	6	90
FPP03	Practical on Communication Skills	PR	6	90
Total			**30**	**450**

List of Qualification Packs for Level 4

1. Assistant Lab Technician - Food and Agricultural Commodities
2. Multi Skill Technician (Food Processing)

Program Outcomes

1. To provide judicious mix of skills relating to a profession and appropriate content of General Education.
2. To ensure that the students have adequate knowledge and skills, so that they are ready to work at each exit point of the programme.
3. To provide flexibility to the students by means of pre-defined entry and multiple exit points.
4. 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. \
5. To provide vertical mobility to students coming out of 10+2 with vocational subjects

FIRST YEAR SEM I
Theory Paper 1
FPT01 Food Science (4 Credits-60 Lectures)

Outcome:

1. Students will understand the basic concepts in food science and will get knowledge of the different food preparation methods.
2. They will understand the requirement of food with respect to energy, food and consumer safety, nutrients and their impact on health.
3. They will get the knowledge of nutritive value of cereals, pulses, nuts, fruits and vegetables, ant nutritional factors, germination of pulses, factors affecting cooking,
4. They will understand the processing of oilseeds, protein isolates, Texturized vegetable protein
5. Students will acquire the knowledge of structure and nutritive value and chemical composition of eggs, fish and meat.
6. They will understand the importance and advantages of health food like probiotics, prebiotics, organic food, nutraceuticals, functional foods

Chapter No	Content	Lectures (60L)
1.	**Introduction of Food Science**	**15**
	Introduction & Definition Of Food Science; Factors Affecting Food Consumption And Taste, Energy Requirement In Human Body, Five Food Groups And Food Guide, Functions Of Food, Classification Of Nutrients, Food Constituents - Carbohydrates, Protein, Fat, Vitamins and minerals. Food Preparation- Reasons For Cooking, Pre-Preparation Of Foods, Methods Of Cooking, Medium Of Cooking, Changes During Cooking. Concept Of Water Activity	
2.	**Composition And Nutritive Value Of Plant Foods**	**15**
	Cereals And Pulses: Structure, Composition, Nutritive Value, Sources	
	Fruits And Vegetables: Composition, Nutritive Value, Fruit Ripening, Climacteric And Non - Climacteric Fruits, Sources	
	Oilseeds: Composition, Nutritive Value, Sources	
	Spices: Definition, Classification, Applications	
3.	**Composition And Nutritive Value Of Animal Foods**	**12**
	Eggs: Structure, Composition, Nutritive Value, Grading Changes During Storage, Quality Of Eggs	
	Fish: Composition, Nutritive Value	
	Meat: Structure, Classification, Composition, Nutritive Value	
	Milk : Composition, Nutritive Value, Properties	
4.	**Color, Flavor And Additives**	**10**
	Natural Food Flavours, Pigments In Food And Their Industrial Applications. Color And Flavor Additives And Application In Food	

5.	**Health Foods**	**08**
	Probiotics, Prebiotics, Synbiotics, GM Foods, Nutraceuticals, Functional Foods,	

REFERENCES BOOKS

1. Potter, N. N. And Joseph, H. Hotchkiss, "Food Science", CBS Publishers And Distributors, New, Delhi, 1996.
2. Fox, B. A. And Cameron, A.G., "Food Science, Nutrition And Health", 5th Ed., Edward
3. Arnold, London, Charley, H., Food Science, John Wiley And Sons Inc., New York, 1982.
4. Foods: Facts And Principles - N Shakuntalamanay M Shadakshara Swamy
5. Food Science - B Srilakshmi
6. Food Science, Chemistry & Experimental Foods - M Swaminathan, Kukude, S And Others.
7. Food Science, Sheth Publications.
8. Mudambi And Sheela Rao: Food Science
9. Srilaxmi: Food Science, New Age International
10. Shakuntala Manay: Foods Facts And Principles, Wiley Eastern
11. Food Chemistry. Meyer, L.H. 1973East-West Press Pvt. Ltd., New Delhi

FIRST YEAR SEM I
Theory Paper 2
FPT02 Food Biochemistry (4 Credits-60 Lectures)

Outcomes:

1. Students will get knowledge of functional carbohydrates.
2. The will get knowledge regarding properties of fats and oil.
3. they will understand the concept of rancidity of oils and its importance in food industry,
4. They will be acquire knowledge of important protein sources in food.
5. Students will get knowledge regarding role of fibers in disease prevention.
6. They will have knowledge about different test used for estimation of protein in food industry.

Chapter No	Content	Lectures (60L)
1.	**Carbodydrates:** Monosaccharides: **C**lassification and properties - Glucose, Fructose, ribulose, ribose Disaccharides: Maltose, Lactose, Sucrose Polysacharides: Starch, Cellulose,Glycogen, Gums, Pectin Dietary fiber Dietary sources – Functional properties of dietary carbohydrates	**12**
2.	**Amino acids and Protein**	**12**
	Amino acids - Classification , properties and identification techniques, Isoelectric points of amino acids, Amino acids - Classification and structure, properties and identification techniques, Isoelectric points of amino acids, Formation of peptide linkages, biological activity	
	Protein: Classification and Structure of protein Functions of proteins in foods – physical and chemical properties of proteins. Important protein sources– Milk, Meat, Fish, Egg and Cereal proteins Qualitative analysis of protein, Protein estimation-Kjeldahl's method	
3.	**Enzymes:** Introduction, nature, classification, nomenclature, role, specificity,lock and key model. Enzymatic browning. Enzymes in food industry. Applications	**12**
4.	**Lipids:** Definition and classification –biological role and uses of lipids, Fat group. classification – Dietary sources Fatty acids in foods nomenclature – Triglycerides – composition and functions. Physical properties of triglycerides – Polymorphism of triglycerides. Properties of fats – Rancidity and reversion of fats. Effect of frying on fats, Technology of edible fats and oils- Refining, Hydrogenation and Interesterification	**12**

5.	**Vitamins:** Definition –Classification, general sources, properties, functions and dietary requirements Deficiency symptoms of vitamins A,D,E,K,C thiamins, riboflavin, niacin and biotin.	**12**
	Minerals: Definition –Classification, general sources, properties, functions and dietary requirements Role of minerals in nutrition Vitamins and minerals general causes of loss in food. Fortifications, Enrichment and Restoration	

References:

1. Food and Nutrition M. Swaminathan
2. Fundamentals of Food & Nutrition S R. Mudambi, M.V. Rajagopal
3. A text book of foods, Nutrition and Dietetics M. Raheena Begum
4. Handbook of Food and Nutrition M Swaminathan
5. Food Chemistry O R. Fennema
6. Food Chemistry L H Meyer
7. Foods Facts and Principles N. Shakuntalamanay & M. Shadaksharaswamy
8. Food Science Norman N. Potter
9. Hand book of Analysis and Quality Control of Fruits & Vegetable Products S. Ranganna
10. Fats in Food Technology K K Rajah

FIRST YEAR SEM I
Theory Paper 3
FPT03 (4 Credits-60 Lectures)
Communication Skills and Personality Development

Outcomes:

1. Students will learn how to write abstract, technical articles and summarize.
2. Students learn how a passage with intonation and voice modulation read.
3. The will get knowledge regarding report writing and resume writing.
4. They will learn overall how to develop a good communication skills.

Sr. No.	Content	Lectures (60L)
1.	**Basics of English Grammar** - Articles - Prepositions - Verbs - Tenses - Transformation of Sentences	8
2.	**Communication Skills** - Meaning and process of communication, - Verbal and non-verbal communication; - Tips for effective communication	6
3.	**Reading and Study Skills** - Skimming/Scanning - Note making - Comprehension Skills - Notice, agenda , - Reading a passage with intonation and voice modulation - Listening and note taking, - Writing skills,	6
4.	**Letter Writing** - Application letters - Regret letters - Appeal/Request letters - Complaint letters	6
5.	**Presentation Skills** - Structuring content - Use of Audiovisual aids - Language of presentation - Presentation Sessions	6
6.	**Conventions of Conversation** - Etiquette and Manners - Conversation- Telephonic - Writing a dialogue and Role play	6
7.	**Personality Development Skills** - Leadership - Teamwork - Time Management	12

	- Stress Management - Positive Attitude - Goal Setting	
8.	**Interview Techniques** - Resume Writing - Covering letter for a job application - How to prepare for an interview - Mock interview sessions - Group Discussion	10

References:

1. M. Frank. Writing as thinking: *A guided process approach, Englewood Cliffs,* Prentice Hall Reagents.
2. L. Hamp-Lyons and B. Heasely: Study Writing; *A course in written English.* For academic and professional purposes, Cambridge Univ. Press.
3. R. Quirk, S. Greenbaum, G. Leech and J. Svartik: *A comprehensive grammar of the English language*, Longman, London.
4. Daniel G. Riordan & Steven A. Panley: *"Technical Report Writing Today"* - Biztaantra.
5. Daniel G. Riordan, Steven E. Pauley, Biztantra: *Technical Report Writing Today*, 8th Ed (2004).
6. Contemporary Business Communication, Scot Ober, Biztantra, 5th Edition (2004)

7. David Green: Contemporary English Grammar, Composition and Structure, Macmillan Publisher

FIRST YEAR SEM I
Practical Paper 1
FPP01 (6 Credits)
Practical on Food Science

Teaching Load: 30Practical/Semester (4 Period Each) **Max Marks 150**

Teaching Period: 2 Periods per Week

Outcomes:

1. Students will understand the structure of starches, gelatinization of starches.
2. They will understand the processes like roasting, tenderization, caremalisation, inversion.
3. They will acquire the knowledge about handling different instruments used in food.
4. They will understand different changes occurred during frying of oil and smoke point of oil.
5. They will understand the importance of egg white foam and their different stages used in food industry.

Sr. No.	Practicals of Food Science (6 Credits)	Practicals
1	Microscopic Structure of Food Starches (Raw And Cooked)	2
2	Gelatinization Properties of Food Starches	2
3	Determination of Relative Density of Milk at Different Temperatures	2
4	Effect of Salt, Acid, Sugar and Fat on the Stability of Egg White Foam	2
5	Effect of Preparation Techniques on Meat Tenderization	2
6	Effect of Roasting on Nuts And Oilseeds	2
7	Inversion, Melting and Caramalization of Sugar	2
8	Determination of Smoking Point, Absorption of Oil and Changes in Physical Parameters of Fats and Oils	2
9	Preparation of Brix/ Brine Solution and Checking by Hand Refractometer/ Salinometer	2
10	Estimation of Fat by Soxhlet Apparatus	2
11	Estimation of Salt Content in Butter/ Brine	2
12	Determination of Gluten Content	2
13	Determination of Acidity of Water and Alkalinity/ Hardness of Water	2
14	Determination of Moisture Using Hot Air Oven / IR	2
15	Study of Different Types of Blanching	2

FIRST YEAR SEM I
Practical Paper 5
FPP02 (6 Credits)
Practical on Food Biohemistry

Teaching Load: 30Practical/Semester (4 Period Each) **Max Marks 150**

Teaching Period: 2 Periods per Week

Outcome:

1. Students will get introduction different types of chemical reactions used for identification of carbohydrates
2. They will be able to estimate FFA content in given oil sample.
3. They will be able to perform estimation of ascorbic acid, protein and reducing sugar from food sample.
4. Students will learn how to write prepare different types of solutions.
5. Students learn about different methods of protein estimation.
6. Students learn about different methods of carbohydrate estimation.
7. They will learn different types of adulteration test used for fats and oils

Sr. No.	Practical on Food Chemistry (6 Credits)	Practical
1	Preparation Of Solutions - Normal, Molar And Per Cent Solutions And Preparation Of Buffers	2
2	Qualitative Tests For Protein	1
3	Quantitative Tests For Protein	2
4	Qualitative Tests For Carbohydrates	1
5	Quantitative Tests For Carbohydrates	2
6	Determination Of pH And Acidity	2
7	Detection Of Adulteration In Fats And Oils	2
8	Estimation Of Ascorbic Acid	2
9	Estimation Of Ash Content In Food	2
10	Estimation Of Iodine Value, Acid Value, Saponification Value Of Oils	2
11	Study Of Enzymatic Browning In Fruits And Vegetables	2
12	Estimation Of Fibre Content In Food	2
13	Determination Of Specific Gravity	2
14	Measurement Of Food Color By Spectrophotometer/ Tintometer	2
15	Effect Of Acid And Alkali On Fruits And Vegetables Color	2
16	Visit To Food Analysis Lab	2

Practical Paper 5
FPP02 (6 Credits)
Practical on Communication Skills and Personality Development

Teaching Load: 30Practical/Semester (4 Period Each) **Max Marks 150**

Teaching Period: 2 Periods per Week

Outcome:

1. Students learn how to read a passage with intonation and voice modulation.
2. They will learn overall how to develop a good communication skills.
3. Students will develop good presentation skills.
4. Students will learn about how meetings and interview are conducted.

Sr. No.	Practials on Communication Skills (6 Credits)	Practical
1	Soft skills	5
2	Role Play	5
3	Group Disscussions	5
4	Presentation Skills	5
5	Mock Meeting/ Confeence	5
6	Mock Interview	5

Semester - II

Subject Code	Name of the Subject	TH/PR	Credits	Contact Hrs.
FPT04	Food Processing Operations	TH	4	60
FPT05	Food Microbiology	TH	4	60
FPT06	Dairy Technology	TH	4	60
FPP04	Practical of Food Processing Operations	PR	6	90
FPP05	Practical of Food Microbiology	PR	6	90
FPP06	Practical of Dairy Technology	PR	6	90
Total			**30**	**450**

List of Qualification Packs and Job Roles for Level 5

1. Dairy Products Processor
2. Supervisor: Dairy Products Processing
3. Dairy Processing Equipment Operator
4. Convenience Food Maker

FIRST YEAR SEM II
Theory Paper 1
FPT04 Food Processing Operations
(4 Credits-60 Lectures)

Chapter No	Content	Lectures (60L)
1.	**Material Handling And Transportation** - Selection Of Material Handling Machines And Conveyors, Belt Conveyor; Belt Conveyor Idlers, Idler Spacing, Belt Tension, Bucket Elevator, Screw Conveyor, Pneumatic Conveyor,	**08**
2.	**Unit Operations** : Review To Heat And Mass Transfer Cleaning (Dry And Wet Cleaning Methods), Sorting And Its Types , Grading, Peeling, Dehulling, Dehusking **Microbial Kinetics:** Kinetics Of Microbial Death, Decimal Reduction Time And Thermal Resistance Constant, Process Lethality	**08**
3.	**Mixing And Moulding:** Mixer For Solid: Equipment- Ribbon Blender, Kneader, Double Cone Mixer, Tumbling Mixers, Dough And Paste Mixers, Mixer For Liquids Bread Moulders, Pie And Biscuit Formers, Confectionery Moulders	**12**
4.	**Evaporators:** Boiling Point Elevation, Types Of Evaporators, Batch Type Pan Evaporator, Natural Circulation Evaporators, Rising Film Evaporator, Falling Film Evaporator, Rising And Falling Film Evaporator, Forced-Circulation Evaporator, Plate Evaporator, Single Effect And Multiple Effect Evaporator	**14**
5.	**Separation**: Principle and Application: Centrifugation, Filtration, Expression, Extraction Using Solvents, Membrane Concentration, Freeze Concentration, Crystallization **Size Reduction:** Cutters & Grinders, Crushers, Gyratory Crusher, Hammer Mill, Ball Mill, Tumbling Mill	**10**
6.	**Refrigeration and Freezing**: Refrigeration, refrigeration cycle, refrigeration load, Freezing methods -direct and indirect, still air sharp freezer, blast freezer, fluidized freezer, plate freezer, spiral freezer and cryogenic freezing**.**	**08**

References

1. Cabe Mc., Smith J.C and Harriot P. Unit operations of Chemical Engineering. Mc Graw Hill Publishers. New Delhi.
2. Stanley E.C. Fundamentals of Food Engineering. AVI Publishers. Westport. USA.
3. Sahay K.M and Singh K.K. Unit operations of Agricultural Processing. Vikas Publishing House Pvt. Ltd. New Delhi.
4. Earle R.L. Unit operations in Food Engineering.
5. Fellows P.J. Food Processing Technology, Principles and Practice. Wood Head Publishing Ltd., Cambridge, England.
6. Singh R. P and Heldman D.R. Introduction to Food Engineering. 3rd Edn.,
7. Smith P.G. Introduction to Food Process Engineering.

FIRST YEAR SEM II
Theory Paper 2
FPT05 Food Microbiology (4 Credit = 60 Lectures)

Chapter No.	Content	Lectures (60L)
1.	**Introduction To Microbiology**	
	Introduction, History And Development Of Microbiology, Definition And Scope Of Food Microbiology, Introduction To Instruments And Equipments Needed In Microbial Studies. Inter-Relationship Of Microbiology With Food Sciences	**8**
2.	**Microbial Growth**	
	Growth Curve, Growth Of Microorganisms In Laboratory, Design Of Media: Composition, Factors Affecting Microbial Growth, Isolation Characterization And Purification Of Microorganisms, Concept Of Pure Culture, Co-Culture And Mixed, Culture, Preservation And Maintenance, Methods For Microbial Cultures, Staining Techniques(Monochrome, Negative, Differential, Special Staining), Cultivation – *In Vitro And In Vivo,* Bioflim Formation	**08**
3.	**Food Borne Diseases, Infections, Intoxication**	**12**
	Types – Food Borne Infections, Food Borne Intoxications And Toxic Infections, Origin, Symptoms And Prevention Of Some Commonly Occurring Food Borne ,Diseases Emerging Pathogens Of Concern Indicator Organisms, Food Borne Pathogens: Bacteria, Food Borne Pathogens: Viruses, Food Borne Pathogens: Eukaryotes, Seafood And Shell Fish Poisoning, Mycotoxins	
4.	**Fermentation**	
	Fermentation–Definition And Types, Design Of Fermenter Microorganisms Used In Food Fermentations, Dairy Fermentations-Starter Cultures ,Types And Methods Of Preservation And Propagation, Lactic Acid And Aroma Compounds Production, Health Benefits Of LAB, Fermented Foods-Types, Methods Of Manufacture For Vinegar, Sauerkraut, Tempeh, Miso, Soya Sauce ,Beer, Wine And Traditional Indian Foods	**14**
5.	**Microbial Food Spoilage**	
	Sources Of Microorganisms In Foods Some Important Food Spoilage Bacteria Changes Caused By Micro-Organisms During Spoilage (Breakdown Of Proteins, Carbohydrates, Fats And Other Constituents) Spoilage Of Specific Food Groups- Milk And Dairy Products, Meat, Poultry And Seafoods, Cereal And Cereal Products, Fruits And Vegetables And Canned Products.	**10**
6.	**Control Of Microbial Growth In Food**	
	Principles And Methods Of Preservation, Physical Methods Of Food Preservation- Dehydration, Freezing, Cool Storage, Heat Treatment (Esp. Thermobacteriology), Irradiation, Chemical Preservatives, Biopreservatives Esp. Bacteriocins, New Non Thermal Methods, Introduction To Hurdle Concept And Predictive Microbiology	**8**

REFERENCE BOOKS

1. General Microbiology - Stanier, 5th Ed.
2. Introduction to Microbiology - Ingraham, 2th Ed.
3. Brock Biology of Microorganisms - Madigan Et Al, 9 Th Ed.
4. Industrial Microbiology - An Introduction, Waites, M.J.
5. Food Microbiology- Frasier
6. Principles of Fermentation Technology- Whitaker. A
7. Industrial Microbiology- A. H. Patel
8. Industrial Microbiology- Lester Earl Casida

FIRST YEAR SEM II
Theory Paper 3
FPT06 Dairy Technology
(4 Credits-60 Lectures)

Chapter No	Content	Lectures (60L)
1.	**Introduction:** Present status of dairy industry in India; **Composition of milk:** Carbohydrates, proteins and fat content of milk from different sources. Factors affecting milk composition, nutritive value **Physical properties of milk** Color, taste,, pH and buffering capacity, refractive index, viscosity, surface tension, freezing, boiling point, specific heat, electrical conductivity. **Dairy Microbiology:** Normal and abnormal flora of milk. Spoilage of milk. Preservation techniques of milk	**08**
2.	**Market milk industry: Milk definition,** Systems of collection of milk, Reception, sampling, Platform testing, Various stages of processing, Filtration, Clarification, Homogenization, Pasteurization, packaging judging and grading of milk, different types of heat exchangers	**08**
3.	**Special milks:** sterilized milk, homogenized milk, flavored milk, vitaminised or irradiated milk, fermented milk, standardized milk, rehydrated milk, recombined milk, toned and double toned Condensed milk and evaporated milk: definition, composition, method of manufacturing, packaging and storage, defects	**12**
4.	**Cream, butter, ghee and butter oil:** Definition, standards, composition, classification, production, packaging, storage, distribution, defects(causes and prevention), judging and grading, antioxidants as preservatives, by products Cheese (Chhedar, Mozzarella, Cottage, Processed) : Definition, standards, composition, classification, production, packaging, storage, distribution, defects(causes and prevention), judging and grading, by products	**14**
5.	**Dried milk and milk products:** objects of production, definition, standards, composition, role of constituents, milk dryers(cold and hot), production of SMP and WMP, Packaging, storage, judging and grading, defects (causes and prevention) **Milk products:** butter milk powder, whey powder, cream powder, butter powder, ice cream mix powder, cheese powder, srikhand powder, khoa powder, channa powder.	**10**
6.	**Ice cream:** Definition, standards, composition, classification, role of constituents, properties of mixture, production, packaging, hardening, storage, distribution, softy ice cream, judging and grading, defects (causes and prevention)	**08**

References:

1. De Sukumar, "Outlines of Dairy Technology", Oxford University Press, New Delhi, 999.

2. Modern Dairy Technology I: Advances in Milk Processing. R.K. Robinson (Ed.). 1986. Elsevier Applied Science Publishers, Ltd., London,
3. Modern Dairy Technology II: Advances in Milk Products. R.K. Robinson (Ed.). 1986. Elsevier Applied Science Publishers, Ltd., London,
4. Dairy Technology _ P Walstra & T. J Geurts
5. Ananthakrishnan.C.P. and M.N.Sinha, "Technology and Engineering of Dairy Plant Operations", Laxmi Publications, New Delhi, 1997.
6. Farrall .A.W., "Engineering for Dairy and Food Products", John Wiley and Sons, New York, 1995.
7. Robinson .R.K., "Modern Dairy Technology Vol.1 "Advances in Milk Processing", Elsevier Applied Science Publishers, London, 1996. 46 FP – 07-08 – SRM – E&T
8. Dairy Science and Technology: Principles and Applications. La Fondation de Technologie Laitiere du Quebec, Inc (Ed.). 1985. Les Presses de 'Universite Laval, Quebec, Canada.
9. Food Engineering and Dairy Technology. H.G. Kessler. 1981. Verlag Kessler, Germany.
10. Milk and milk products – C H Ecles W B Combs
11. The Technology of Milk processing _ Ananthakrishnan, Khan, Padmanabhan
12. Modern Technology of Milk processing & Dairy products _ NIIR

FIRST YEAR SEM II
Practical Paper 4
FPP04 (6 Credits-90 Lectures)
Practical of Food Processing Operations

Teaching Load: 30 Practical/Semester (4 Period Each) **Max Marks 150**

Teaching Period: 2 Periods per Week

Sr. No.	Practicals of Food Processing Operations (6 Credits)	Practical
1	Determination of physical, mechanical and textural properties of foods.	02
2	Practical on Preservation of food by the process of freezing	02
3	Practical on Comparison of conventional and microwave processing of food	02
4	Practical on Preservation of food by canning	02
5	Practical on Cut-out analysis of canned food	02
6	Practical on Packaging and testing of packaging material of foods	02
7	Practical on Drying of food using dryer	02
8	Practical on Osmotic dehydration	02
9	Practical on Minimal Processing	02
10	Study of different types of heat exchangers used in Food Industry	02
11	Practical on Thermal processing	02
12	Practical on Separation processes	02
13	Practical on centrifugal separation (cream separator)	02
14	Practical on determination of firmness of foods	02
15	Determination of viscosity of different food materials	02

FIRST YEAR SEM II
Practical Paper 5
FPP05 (6 Credits-90 Lectures)
Practical on Food Microbiology

Teaching Load: 30Practical/Semester (4 Period Each) **Max Marks 150**

Teaching Period: 2 Periods per Week

Sr. No.	Practicals on Food Microbiology (6 Credits)	Practical
1	Introduction to Microbiology Laboratory	02
2	Compound Microscope	02
3	Plugging and Wrapping of Glasswares Used in Lab.	02
4	Preparation of Different Types of Media and Slant, Stab and Plate	02
5	Sterilization Of Medium Using Autoclave / Hot Air Oven And Assessment For Sterility	02
6	Morphological Study Of Bacteria And Fungi Using Permanent Slides	02
7	Simple Staining	02
8	Negative Staining	02
9	Gram's Staining	02
10	Bacteriological Analysis Of Water	02
11	Biochemical Test For Identification Of Bacteria.	02
12	Methylene Blue Reduction Test	02
13	Isolation Of Bacteria By Using Streak Plate Method.	02
14	Isolation Of Bacteria By Using Spread Plate Method.	02
15	Isolation Of Bacteria By Using Pour Plate Method.	02

FIRST YEAR SEM II
Practical Paper 6
FPP06 (6 Credits-90 Lectures)
Practical of Dairy Technology

Teaching Load: 30 Practical/Semester (4 Period Each) **Max Marks 150**

Teaching Period: 2 Periods per Week

Sr. No.	Practicals of Dairy Technology (6 Credits)	Practical
1.	Determination of chemical properties of milk/milk products (fat, protein, acidity, SNF, Specific gravity, Ash, etc)	02
2.	Adulteration in milk	02
3.	Platform And laboratory tests for milk and Milk products	02
4.	FFA of Ghee	02
5.	Moisture content of butter/ Ghee	02
6.	Salt content in butter	02
7.	Preparation of dahi & srikhand/fruitkhand	02
8.	Preparation of different types of milk- pasteurized, toned, flavoured etc.	02
9.	Preparation of Khoa and khoa based products	02
10.	Preparation of paneer	02
11.	Preparation of cheese- different types	02
12.	Ice cream-ingredients and their roles, preparation	02
13.	To prepare casein and calculate its yield	02
14.	Visit to dairy industry and report writing	02
15.	Dairy plant layout and marketing study	02