

Sem III Paper 1
BvFt 301: Principles of Food Preservation (3 Credits)

Sr. No.	Topics	Lectures (45L)
1.	<p>Introduction</p> <p>Review of heat and mass transfer phenomena, Effects of processing on food materials, Energy in food processing</p>	3
2.	<p>Water in Foods</p> <p>Structure and physical properties of water, Vapor pressure, Colligative properties, Moisture content and water activity, Solubility of sugars and salts in water, Microwave heating</p>	4
3.	<p>Drying</p> <p>Definition, Psychrometry, Relative humidity, Drying theory. Sun drying and dehydration, factors affecting drying operations. Industrial drying operations. Spray drying. Drum drying, vacuum, air, fluidized beds and freeze drying. Quality and stability of dried foods. Rehydration properties. Sensory and nutritive aspects. Intermediate moisture foods.</p>	10
4.	<p>Freezing</p> <p>Refrigeration and freezing. Freezing theory: ice nucleation and growth, supercooling, Freezing of aqueous solutions, freezing point depression, volume, solute effects. Freezing of cells and biological materials, Cryoprotective agents, types of freezing, i.e. quick and slow freezing, Freezing of solids, liquids and precooked foods, storage and thaw effects, freezer burn. Cold generation and food freezing technology: Responses of foods to freezing preservation, Related processes: freeze concentration, freeze texturation.</p>	10
5.	<p>Heat Preservation</p> <p>Pasteurization, blanching and sterilization. Thermal resistance of major spoilage microorganisms, vegetative bacteria and spores. Destruction kinetics, D, F, z values. Heat penetration. Effects of heat on nutrients, enzymes and quality parameters. Industrial sterilization processes: canning, flame sterilization, retortable pouch, UHT, aseptic packaging, processing of particulates. Acid and low acid products. Inoculated packs, PA 3679, Vacuum in cans. Spoilage of canned foods.</p>	10
6.	<p>Food Irradiation</p> <p>Kinds of ionising radiations used in food industry, Radiation dosimetry. Effects of radiation on microorganisms. Concept of cold sterilization. Flavor and texture changes in irradiated foods. Regulatory aspects. Current status of industrial irradiation processes.</p>	5

7.	Non-thermal food preservation Principles. High pressure processing. Current status of industrial processes.	3
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References:

1. Potter, N.N., Hotchkiss, J.H. 1995. Food science, 5th ed. New York, Chapman & Hall.
2. Manay s. Shadaksharswami M. : foods, facts and principles, New Age Publishers, 2004
3. De sukumar, outlines of dairy technology, Oxford University Press, 2007. Frazier W.C. *Food Microbiology*,(2000) 2nd edition Tata Mc Graw – Hill Publishing Company Ltd. New Delhi.
4. Jay J.M. (1992) *Modern Food Microbiology* 5th edition CBS Publishers and Distributors, New Delhi.
5. Pelczar, M.J. Chan. C.S. and Krieg N.R. (1996) *Microbiology* 5th edition, tata McGraw – Hill Edition.
6. Vasanthakumari R (2007) *Textbook of Microbiology* BI Publications Pvt. Ltd., New Delhi.
7. Ibarz, A., Barbosa-Cánovas, G.V. 2003. Unit operations in food engineering, Boca Raton, Fla.,CRC Press, 889 p.
8. Earle, R. L. 1983. Unit operations in food processing. Pergamon Press, Toronto, Canada.
9. Desrosier, N.W. 1970. The technology of food preservation. AVI Publ. Co., Westport, Conn.,pp. 170-174, 405 p.
10. Sun, D.W. 2006. Thermal food processing: new technologies and quality issues. Boca RatonCRC/Taylor & Francis, 640 p.

Sem III Paper 2
BvFt 302 : Food safety standard (3 Credit)

Sr. No.	Content	Lectures (45L)
1	Food Safety Management Tools <ul style="list-style-type: none"> • Basic concept • Prerequisites- GHPs ,GMPs, SSOPs etc • HACCP • ISO series • TQM - concept and need for quality, components of TQM, Kaizen. • Risk Analysis • Accreditation and Auditing 	15L
2	Microbiological criteria <ul style="list-style-type: none"> • MRA • Microbiological standards and limits (for processed food, water) • Microbiological Assessment and categories of food based on microbial • Quality • Sampling • Basic steps in detection of food borne pathogens • Water Analysis • Assessment of Surface Sanitation and Personal Hygiene 	12 L
3	Food laws and Standards <ul style="list-style-type: none"> • Indian Food Regulatory Regime • Global Scenario • Other laws and standards related to food 	10 L
4	Recent concerns <ul style="list-style-type: none"> • New and Emerging Pathogens • Packaging ,Product labelling and Nutritional labelling • Genetically modified foods \ Transgenics • Organic foods • Newer approaches to food safety • Recent Outbreaks 	12 L

References:

1. Lawley, R., Curtis L. and Davis,J. The Food Safety Hazard Guidebook , RSC publishing, 2004
2. De Vries. Food Safety and Toxicity, CRC, New York, 1997
3. Marriott, Norman G. Principles of Food Sanitation, AVI, New York, 1985
4. Forsythe, S J. Microbiology of Safe Food, Blackwell Science, Oxford, 2000 & Sons; USA, 1987

Sem III paper 3

BvFt 303 : Post Harvest management of fruit and vegetables (3 credits)

Sr. No.	Topics	Lectures (45L)
1.	<p>Introduction</p> <ol style="list-style-type: none"> 1. Importance of fruits and vegetables 2. History and need of preservation, Reasons of spoilage 3. Current status of production and processing of fruits and vegetables. Structural, compositional and nutritional aspects. 4. Post-harvest physiology, handling, losses and conservation of fruits and vegetables 5. Methods of preservation (short and long term) 	7
2.	<p>Canning and bottling of fruits and vegetables</p> <ol style="list-style-type: none"> 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 	7
3.	<p>Fruit beverages</p> <ol style="list-style-type: none"> 1. Introduction 2. Processing of fruit juices (selection,juice extraction, deaeration, straining, filtration and clarification 3. Preservation of fruit juices (pasteurisation, chemical preservation with sugars, freezing, drying, tetra packing, carbonation) 4. Processing of cordials, nectars, squashes, concentrates and powders 	7
4.	<p>Jams, Jellies and marmalades</p> <ol style="list-style-type: none"> 1. Introduction 2. Jams: constituents, selection of fruits, processing and technology 3. Jelly : essentials of constituents (role of pectin and ratio), theory of jelly formation, processing and technology, defects 4. Marmalade: types, processing and technology, defects 	7
5.	<p>Pickles, chutney and sauces</p> <ol style="list-style-type: none"> 1. Types 2. processing and technology <p>causes of spoilage</p>	4
6.	<p>Tomato products</p> <ol style="list-style-type: none"> 1. selection of tomatoes 2. pulping and processing tomato puree, sauces, ketchup, soup and paste 	4
7.	<p>Dehydration of foods and vegetables</p>	5

	1. sun drying and mechanical dehydration 2. process variation of fruits and vegetables packing and storage	
8.	Technology of plantation products : tea- coffee and cocoa	4
	1. processing 2. variety of products	

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

Sem III Paper 4
BvFt 304: Food Analysis (3 Credit)

S.No	Title	Lectures (45L)
1.	Techniques of analysis: gravimetric, titrimetric, colorimetric, spectrophotometric, chromatographic (Brief principle and instrumentation)	10
2.	Physical, chemical and rheological properties of food	5
3.	Principles of analysis of various food constituents and subsequent changes on packaging Sensory attributes of foods: mechanisms of sensation and perception of colour, taste, odour, and flavour; importance and use of sensory evaluation methods; facilities required for sensory evaluation	10
4.	Texture profile; selection of trained panelists: type of panelist suitable for different tasks and methods;	5
5.	Conditions for sensory analysis: room, serving and preparation of samples; application of consumer tests;	5
6.	Control of factors affecting accuracy and precision of sensory data; Analysis of sensory data;	5
7.	Statistical testing; correlating instrumental and sensory measurements.	5

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

Sem III Paper 5
BvFt 305: Applied Statics (1 Credits)

Sr. No.	Applied statics (1 Credits)	Lectures (15L)
1	Definition, Aims, Characteristics and Limitations of statistics, Classification and Tabulation of data. Scope of statistics in Plant science (examples) Statistics as statistical data : various types of data (Raw data, grouped data)Representation of data using frequency distribution diagram (Simple/Multiple/Subdivided bar diagram, Pie diagram),Graphs (Histogram, polygon, curve)	4
2	Population, sample, sampling methods (SRS, Stratified, sampling)	2
3	Definition, advantages and disadvantages of Arithmetic Mean, Median, Mode; Geometric Mean,	2
4	Mean Deviation, Variance, Standard Deviation and Coefficient of variation as measures of dispersion	2
5	Definition, merits and demerits of Non-random sampling and Random Sampling. Concept of Standard Error. Basic concepts used in tests of Significance like Null Hypothesis,	3
6	ANOVA 1) one way, 2) two way followed by t test (pairwise)	2

Reference books:

1. Statistical Methods for Agricultural Workers by Panse, V. G. & P.V. Sukhatme 1967. ICAR, New Delhi.
2. Statistical Methods by Snedecor, G.W. Cochran 1968. Oxford & IBH Publ. Co., Calcutta.
3. Biometrical Genetics by Mathur, K. & J.L. Jinks. 1974. Chapman & Hall Ltd. London.
4. Statistics (Theory, Methods & Application) by Sancheti, D.C. & V.K. Kapoor. 1985. Sultan Chand & sons, New Delhi.
5. A Textbook of Agricultural Statistics by Rangaswamy, R. 1995. New International publishers Ltd., New Delhi.

Sem III Practical 1
BvFt 306: Practicals on Food Preservation (3 Credits)

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

Sem III Practical 2
BvFt 307: Practicals on Food Safety standards (3 Credits)

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

Sem III Practical 3
BvFt 308 : Practical of Post Harvest management of fruit and vegetables

S.No.	Post Harvest management of fruit and vegetables (3 credits)	Practical (15P)
1	Determination of moisture content of fruit and vegetable	1
2	Quality parameter evaluation of fresh fruit and vegetable.	2
3	Controlling enzymatic browning in fruit and vegetable	1
4	Pre treatment and drying of fruit and vegetable	2
5	Experiment on dried product quality evaluation.	1
6	Preparation of mixed fruit jam	1
7	Preparation of jellies	1
8	Preparation of mango bar	1
9	Osmotic dehydration of fruits and vegetables.	1
10	Sensory evaluation of processed products.	1
11	Preparation of sauce and ketchup	2
12	Preparation of squash	1

Sem III practical 4
BvFt 309: Food Analysis (Practicals) Credits: 3

S.No	Title	Practical (15P)
1.	Quality analysis of milk	1
2.	Experiments on fat tests.	1
3.	Determination of gluten content	1
4.	Quality analysis of water	1
5.	Separation and identification of amino acids by paper chromatography	2
6.	Determination of total soluble solids	1
7.	Determination of titratable acidity and pH of fruit juice	1
8.	Saponification value and unsaponifiable matter of fats and oils.	2
9.	Iodine value of fats and oils	1
10.	Free fatty acids in fats and oils	2
11.	Determination of protein in foods (Folin/Ciocalteau method)	1
12.	Estimation of fat by Soxhlet extraction method.	1

BOOKS

1. Earle R.L., "Unit operations in Food Processing", Pergamon Press.
2. Unit Operations in food engineering. Gustavo.V. 2003. CRC Press
3. McCabe, W.L. and Smith.J.C. "Unit Operations of Chemical Engineering", McGraw-Hill, 76.
4. Magnard Joslyn, "Food Processing Operations", AVI Publishing Company.Food Process Design. Zacharias.B. 2003. CRC Press.

Sem IV Paper 1
BvFt 401: PROCESSING OF SPICES AND FLAVOURING AGENTS
(3 Credits)

Sr No.	Topics	Lectures (45L)
1	Production and processing scenario of spices, flavour & plantation crops and its scope	2
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	8
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, Asafoctida	5
4	Spice oils, packaging of spices and spice products	3
5	Overview on flavouring compounds used in Food	2
6	Synthetic flavouring agents and their stability (Wines, spirits, MSG and vinegars)	7
7	Flavours of soft drinks, Baking and confectionery industry	3
8	Natural flavouring agents and their stability(Vanilla, Cocoa beans, Olive oil, mustard oil and walnut oil)	7
9	Separation, purification and identification of natural flavoring	3
10	Marinades and types of marinades(cooked and raw)	2
11	Standards specification of spices and flavours	3

REFERENCE BOOKS

1. Spices – vol. II - Parry J.W.
2. Spice and condiments - Pruthi J.S.
3. Herbs and spices - Rosemary Hemphill
4. The book of spices - Rosen garten, F. and Livingston Jr.
5. Spices and herbs for the Food Inudstry - Lewies, Y.S.
6. Spices Vol. I and II; Tropical Agril. Series - Purseglove, J.W. Brown E.G., Green C.L. And Robbins SRJ.
7. Food Flavourings - P.R. Ashust

Sem IV Paper 2

BvFt 402: Dairy Technology (Credit 3)

Sr. no	Content	Lectures (45L)
1	Present status of dairy industry in India; Physical properties of milk Color, taste,, pH and buffering capacity, refractive index, viscosity, surface tension, freezing, boiling point, specific heat, OR, electrical conductivity.	3
2	Composition of milk : Carbohydrates, proteins and fat content of milk from different sources.	4
3	Lactose : Lactose (alpha and beta forms and their differences) Significances of lactose in dairy industry.	1
4	Milk fat : Composition and structure, factors affecting melting point, boiling point, solubility and Refractive Index, fat constants (saponification value, iodine value, RM value, Polenske value, peroxide value). Chemical reactions of fat (hydrolysis, auto-oxidation), condition favouring auto oxidation, prevention, measurement of auto-oxidation.	7
5	Protein and Enzymes : General structure, amphoteric nature, difference between casein and serumprotein, different types of casein (acid and rennet), uses of casein, fractionationof protein. Enzymes- catalase, alkaline phosphatase, lipases and proteases.	6
6	Dairy Microbiology : Normal and abnormal flora of milk. Spoilage of milk. Preservation techniques of milk.	5
7	Market milk industry and milk products Systems of collection of milk, Reception, Platform testing, Various stages of processing, Filtration, Clarification, Homogenization Pasteurization, Description and working of clarifier, cream separator, homogenizer and plate heat exchanger. Manufacturing of milk products- Butter, ghee, flavored milk,yoghurt, dahi, shrikhand, ice-cream, condensed milk, milk powder,channa, paneer, cheese (cheddar).	13
8	CLEANING AND PACKAGING Principles of Cleaning- -can washing- - Cleaning Cycle, Washing Methods- Types of Can washers cleaning-inplace- Cleaning procedures, -Centralized and De-centralized CIP systems -- corrosion control.	6

References:

1. Tufail Ahmed, "Dairy Plant Engineering and Management", CBS Publishers and Distributors, New Delhi, 2001.
2. De Sukumar, "Outlines of Dairy Technology", Oxford University Press, New Delhi, 1999.
3. Modern Dairy Technology I: Advances in Milk Processing. R.K. Robinson (Ed.). 1986. Elsevier Applied Science Publishers, Ltd., London, UK.
4. Modern Dairy Technology II: Advances in Milk Products. R.K. Robinson (Ed.). 1986. Elsevier Applied Science Publishers, Ltd., London,
5. Dairy Technology _ P Walstra & T. J Geurts
6. Ananthakrishnan.C.P. and M.N.Sinha, "Technology and Engineering of Dairy Plant Operations", Laxmi Publications, New Delhi, 1997.
7. Farrall.A.W., "Engineering for Dairy and Food Products", John Wiley and Sons, New York, 1995.
10. 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
12. Dairy Science and Technology: Principles and Applications. La Fondation de Technologie Laitiere du Quebec, Inc (Ed.). 1985. Les Presses de
13. 'Universite Laval, Quebec, Canada.
14. Food Engineering and Dairy Technology. H.G. Kessler. 1981. Verlag Kessler, Germany.
15. Milk and milk products – C H Eccles W B Combs
16. The Technology of Milk processing _ Ananthakrishnan, Khan, Padmanabhan
17. Modern Technology of Milk processing & Dairy products _ NIIR

Sem IV Paper 3
BvFt 403 : FOOD PACKAGING TECHNOLOGY (Credits 3)

Sr. No.	Topic	Lectures (45L)
1	INTRODUCTION TO PACKAGING Introduction- evaluation of packaging- economics- packaging operations- packaging terminology. Hazards in distribution- functions of package- design of packages for various foods.	5
2	PROPERTIES AND SHELF LIFE OF PACAKGING MATERIALS Development of protective packaging- shelf life studies using packaging materials-methods of shelf life estimation- packaging materials- properties and identification- paper and paper boards.	7
3	TYPES AND METHODS OF PACKAGING Regenerated cellulose film- plastic films- Aluminium foils and laminations. Edible packaging- Food packaging bags, pouches, carton boxes, metal and plastic tubes, moulded plastic containers, glass containers. Special packaging methods- vacuum and gas packaging, shrink package, retort pouches- Bio degradable packages.	10
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.	7
5	SELECTION OF PACKAGING MATERIALS Special problems of packaging food stuffs- packaging of various foods- compatibility- toxicity- packaging equipments- packaging standards and regulations.	6
6	LEGAL AND MANGEMENT 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 Aestheticand graphic design, labeling in packages, coding and marking including bar coding.	5
7	Evaluation of quality and safety of packaging materials – different testing procedures	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
10. Paine, F.A. and Paine, H. Y, (1993), Handbook of Food Packaging, Kluwa AcademicPublisher, van Nostrand, Rein hold, New York.

Sem IV Paper 4

BvFt 404: Computer Application in food industry (Credits 3)

Sr. No.	Computer Application (3 credits)	Lecture (45L)
1	Introduction to Computers, A brief history of computing. Data Processing and Information. Anatomy of Computers, Input and Output Devices. various types of memories.	4
2	Units of Memory, various types of memories. Hardware, Software and Classification of Computers.	4
3	Personal Computers, Types of Processors, booting of computer, warm and cold booting. Computer Viruses, Worms and Vaccines.	4
4	WINDOWS: GUI, Desktop and its elements, WINDOWS Explorer, working with files and folders; setting time and date, starting and shutting down of WINDOWS. Anatomy of a WINDOW, Title Bar, Minimum, Maximum and Close Buttons, Scroll Bars, Menus and Tool Bars. DOS : Some fundamental DOS Commands, Rules for naming files in DOS and Types of files.	6
5	Applications – MSWORD: Word, processing and units of document, features of word-processing packages. Creating, Editing, Formatting and Saving a document in MSWORD;	5
6	MS Power Point: Features of Power Point Package. MSACCESS: Concept of Database, Units of database, creating database;	4
7	Principles of Programming: Flow Charts and Algorithms, illustration through examples.	4
8	Internet: World Wide Web (WWW), Concepts, Web Browsing and Electronic Mail. Network Topologies associated hardware devices,gadgets(router and switches)tools,services,resources. Network topologies and protocols11,LAN, MAN and WAN, Network security:firewalls	10
9	Internet searches: Google, Yahoo and concepts in text based searching. Computer Application in food industry,	4

Reference Book:

1. Computer Studies – a First course – J. Shelly and R. Hunt.
2. Programming in BASIC – E.Balagurusamy
3. Microsoft Windows XP Manual.
4. Microsoft Office XP Manual.

SEM IV Practical 1
BvFt 405: PRACTICALS OF PROCESSING OF SPICES AND FLAVOURING AGENTS
(Credit 3)

S. No.	TOPICS	Practicals (15P)
1	Identification and characterization of flavouring compounds of spices	2
2	Packaging study of spices	2
3	Preparation of curry powder	3
4	Preparation of flavoured oils(Garlic oil, Green chilli oil and Basil oil)	2
5	Preparation of Indian Masala for different foods	3
6	Preparation of various marinades	2
7	Study of standard specification of spices	1

Sem IV Practical 2
BvFt 406 : Practical of Dairy Technology (Credits 3)

Sr. No.	Topic	Practical (15p)
1	Acidity of Milk, curd & butter.	1
2	Estimation of fat and protein content in Milk	1
3	Determination of total solids, SNF and specific gravity of milk	1
4	Determination of Total ash in milk	1
5	Moisture content of butter	1
6	Salt content in butter	1
7	Adulteration in milk	1
8	Preparation of different types of milk- pasteurized, toned, flavoured etc.	1
9	Preparation of Khoa, Peda	1
10	Moisture content in Ghee	1
11	FFA of Ghee	1
12	Preparation of paneer	1
13	Preparation of cheese- different types	1
14	Ice cream-ingredients and their roles, preparation	1
15	To prepare casein and calculate its yield	1

Sem IV Practical 3
BvFt 407: PRACTICAL ON FOOD PACKAGING TECHNOLOGY
(Credits 3)

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, tensile strength of papers, bursting strength and WVTR of packaging materials	3
4	Measurement of thickness of packaging materials; testing of chemical resistance of packaging materials	2
5	Determination of shelf life of packaged foods; determination of ERH of foods	2
6	Determination of drop test of food packages	1
7	Introduction of students with the latest trends in packaging consulting the websites and magazines	2
8	Determination of cooling load for cold storages.	1
9	Problems on Design of cold storages. Visit to cold storages.	2

Sem IV Practical 4

BvFt 408: Practical on Computer Application in food industry (Credits 3)

Sr. No.	Practical on Computer Application in food industry (3 credits)	Practical (15 P)
1	Study of Computer Components; Booting of Computer and its Shut Down;	2
2	Practice of some fundamental DOS Commands, TIME, DATE, DIR, COPY, FORMAT, VOL, LABEL, PATH;	2
3	Practicing WINDOWS Operating System, Use of Mouse, Title Bar, Minimum, Maximum and Close Buttons, Scroll Bars, Menus and Tool Bars;	2
4	WINDOWS Explorer, Creating Folders, COPY and PASTE functions; MSWORD: Creating a Document, Saving and Editing; MSWORD, Use of options from Tool Bars, Format, Insert and Tools (Spelling & Grammar) Alignment of text;	2
5	MSWORD, Creating a Table, Merging of Cells, Column and Row width; MSEXCEL: Creating a Spreadsheet, Alignment of rows, columns and cells using Format tool bar; MSEXCEL: Entering Expressions through the formula tool bar and use of inbuilt functions, SUM, AVERAGE, STDEV;	1+1
6	MSEXCEL: Data Analysis using inbuilt Tool Packs, Correlation & Regression; MSEXCEL: Creating Graphs and Saving with & without data; MSACCESS: Creating Database, Structuring with different types of fields;	3
7	MS Power Point: Preparation of slides on Power Point; Transforming the data of WORD, EXCEL and ACCESS to other formats;	1
8	Internet Browsing: Browsing a Web Page and Creating of E-Mail ID. Searching and surfing.	1