Rayat Shikshan Sanstha's

Karmaveer Bhaurao Patil College Vashi

[Autonomous College]

Syllabus for Approval

Sr. N0.	Heading	Particulars
1	Title of Course	F.Y.B.Voc. Food Technology
2	Eligibility for Admission	10+2 (of recognized board)
3	Passing Marks	40%
4	Ordinances/Regulations (if any)	-
5	No. of Years/Semesters	Three years/ Six semester
6	Level	U.G.
7	Pattern	Semester
8	Status	New Syllabus
9	To be implemented from Academic year	2019-2020

AC- 01/09/2018

Item No- 2.30

Rayat Shikshan Sanstha's

KARMAVEER BHAURAO PATIL COLLEGE, VASHI, NAVI MUMBAI

[AUTONOMOUS COLLEGE]

Sector-15- A, Vashi, Navi Mumbai - 400 703

Syllabus for F.Y.B.Voc.

Program: B. Voc.Food Technology

Course: F.Y.B.Voc. Food Technology

(Choice Based Credit, Grading and Semester System with effect from the academic year 2018-2019)

Preamble

Food Technology is a B.Voc. course and an under graduation programme at Karmaveer Bhaurao Patil College Vashi, Navi Mumbai [Autonomous College]

With liberalization of Indian economy, all-round industrial growth has been witnessed in all sectors with improvement in social and economic conditions of our people. This has created demand for more and better-quality foods. With advancement in production technology, high yield levels will lead to large amount of marketable surplus of food grains and crop residues, demanding appropriate handling, processing, preservation, storage, marketing and utilization. The development of processing industries to preserve the perishable agricultural produce will not only improve economic and nutritional status of our population but it may help in employment generation in rural as well as urban areas of the country. This can be achieved by linking production, and post-harvest technology in synergistic way.

At present the export from agro-sector represents about 16% of total Indian exports. The primary export commodities are cereals, fruits, vegetables and their processed products, and marine products but fast-growing specialty products have also penetrated in foreign markets. Considering the contribution of these products in Indian export, it is necessary to have appropriate technology for handling and processing of agricultural produce. The importance of Food processing and Quality Control lies in the fact that it has capability to provide food to our population through scientific conservations, eliminating avoidable losses and making available more balanced and nutritious food. High value products from low grade material can be produced by innovative and appropriate processing and packaging technologies and also from byproducts and residue waste using integrated approach. Thus, modernization of post-harvest operations and agro-processing industries through innovative and appropriate technology has a vital role to play in national economy in general and rural economy in particular.

Considering the above aspects, the role of food technologist does not stop at farm level but it continues till the harvested crops and animal products are processed, preserved and further modified into useful and nutritious products, until it utilized by the consumer. So, the post-harvest handling and processing need to be attended on priority basis at national and international level. Moreover, with development of processing industries, it is quite likely that the demand for food scientists and technologists will increase in the next few decades. Hence, specializations offered at graduate level need to be strengthened considering

occupational needs as well as demands of the food industries. The field of food quality assurance has evolved substantially over the past decade, and certain key developments have become widely accepted.

These include Quality Systems (e.g., ISO) and HACCP. Consequently, it has become essential for undergraduate Food processes and Quality Control students preparing for careers in the food industry to have some basic training in these systems as part of the curriculum in their university or college programs. The B.Sc. programme integrates the latest principles, practices, and terminology of food safety systems with those of quality management systems to provide an understanding of a single food quality management system.

Syllabus for F.Y.B.Voc. Food Technology

This practical and informative course provides participants with foundational knowledge related to all aspects of food science presented by world renowned experts. This course is designed for any one working in food industry or in the field of food processing in order to increase their knowledge in food chemistry, sensory science, food safety, food packaging and functional foods and Nutraceutical. This course is designed to give a overview of the most relevant aspects of food science typically covered over our three year under graduate programme. Food processing can be defined as the application of basic sciences and engineering to study the basic and fundamental physical, chemical and biochemical nature of foods and the principles of food processing. Food processing and quality management is the science of processing, packaging of food items and quality assurance. Fruits, vegetables, sea foods, meats, cooked foods, snacks, confectionaries, beverages, juices, canned juices and fruits all come under the preview of food processing and quality management.

Objectives of the Course:

- To enrich students' knowledge and train them in the food processing technology
- To introduce the concepts of quality assurance, safety management
- To inculcate sense of scientific responsibilities and social and environment awareness
- To help student build-up a progressive and successful career

Course Outcome:

By the end of the course, a student should develop the ability:

- To understand, coherently and effectively about various aspects of food processing.
- To develop the understanding and interest in the field of food processing
- To develop basic skills in quality control and its industrial applications.

Program Specific Outcome (Considered first year)

- To understand the knowledge of food, food analysis, food spoilage and principles of food preservation, food QA and QC
- To get the practical knowledge of bakery and confectionary technology
- To develop a skill in Entrepreneurship Development and Project Management

F. Y. B. Voc. Food Technology

Semester I

Sr. No	Paper No.	Title	Theory / Practical/ Project	Total Marks	Distribution of Total Marks (100)	
					End Semester Theory	Internal Assessment
1	UGFT 101	Communication Skills in English and computer skills	Theory	100	60	40
2	UGFT 102	Introduction to Food	Theory	100	60	40
3	UGFT 103	Introduction to Food spoilage	Theory	100	60	40
4	UGFT 104	Principles of Food Preservation-I	Theory	100	60	40
5	UGFT 105	Bakery Technology-I	Theory	100	60	40
6	UGFT 106	Confectionary Technology-I	Theory	100	60	40
7	UGFT 107	Food analysis	Theory	100	60	40
8	UGFTP01	Food Processing Practical-I	Practical	350	-	-

Semester II

Sr. No	Paper No.	Title	Theory/ Practical/ Project	Total Marks (Total)	Distribution of Total Marks (100)	
					End Semester Theory	End Semester Theory
1	UGFT 201	Entrepreneurship Development and Project Management	Theory	100	60	40
2	UGFT 202	Dairy Technology	Theory	100	60	40
3	UGFT 203	Packaging Technology	Theory	100	60	40
4	UGFT 204	Sanitation and Hygiene	Theory	100	60	40
5	UGFT 205	Principles of Food Preservation-II	Theory	100	60	40
6	UGFT 206	Ice-cream technology	Theory	100	60	40
7	UGFT 207	Food QA and QC	Theory	100	60	40
8	UGFTP02	Food Processing Practical-II	Practical	350	-	-

Examination Scheme for Each Semester:

Semester End Examination: 50 Marks will be as follows –
Tutorials -10 marks
Theory exam -40 marks

I.	**Theory:** The Semester End Examination for theory course work will be conducted as per the following scheme.	
	Each theory paper shall be of two- and half-hour duration.	
	All questions are compulsory and will have internal options.	
	Q – I	From Unit – I (having internal options.) 10 M
	Q – II	From Unit – II (having internal options.) 10 M
	Q – III	From Unit – III (having internal options.) 10 M
	Q – IV	From Unit – IV (having internal options.) 10 M
II.	**Practical**	The Semester End Examination for practical course work will be conducted as per the following scheme.

Sr. No.	**Particulars of Semester End Practical Examination**	**Marks%**
1	Laboratory Work	30
2	Journal	10
3	Viva	10
	TOTAL	**50**

Choice Based Credit, Grading and Semester System with effect from the academic year 2018-2019

F. Y. B. Voc. Food Technology

SEMESTER I

Course Code	Unit	Topics	Credits	Lec / Sem
UGFT 101	**Communication Skills in English and computer skills**			
	I	Grammar and Listening	4	15
	II	Speaking & Reading Writing		15
	III	Information Concepts and Processing		15
	IV	Computers and Communication		15
UGFT 102	**Introduction to Food**			
	I	Concept of Food and their functions	0.8	3
	II	Classification of Food		3
	III	Methods of cooking		3
	IV	Food Preparation and storage		3
UGFT 103	**Introduction to Food spoilage**			
	I	Food as Substrate for Microorganisms	0.8	3
	II	General principles Underlying Spoilage		3
	III	Microorganisms important in causing food spoilage		3
	IV	Spoilage in different food groups		3
UGFT 104	**Principles of Food Preservation-I**			
	I	General principles of Food preservation	0.8	3
	II	Preservation by use of High temperature		3
	III	Preservation by use of Low temperature		3
	IV	Preservation by Removal of Moisture		3
UGFT 105	**Bakery Technology-I**			

	I	Introduction to bakery and Primary processing equipment used in Bakery	0.8	3
	II	Manufacture of Sugar		3
	III	Properties of wheat		3
	IV	Bread manufacturing		3
UGFT 106	**Confectionary Technology-I**			
	I	Introduction to confectionery industry and primary processing equipment used in Confectionery	0.8	3
	II	Classification of confectionery		3
	III	Biscuit manufacturing		3
	IV	Confectionary Products		3
UGFT 107	**Food analysis**			
	I	Introduction to samples	0.8	3
	II	Analysis of chemical constituents		3
	III	Analysis of Food		3
	IV	Microscopic analysis of foods		3
UGFTP 01	-	Food Processing Practical-I	4	20

SEMESTER II

Course Code	Unit	Topics	Credits	Lec / Sem
Entrepreneurship Development and Project Management				
UGFT 201	I	Introduction to Entrepreneurship	4	15
	II	Entrepreneurial Development Programme and Role of institutions/schemes		15
	III	Project		15
	IV	Setting up of micro small and medium		15

		enterprises		
UGFT 202	**Dairy Technology**			
	I	Introduction to Dairy chemistry	0.8	3
	II	Processing of market milk		3
	III	Indigenous and Fermented milk products		3
	IV	In-Plant cleaning system		3
UGFT 203	**Packaging Technology**			
	I	Introduction to packaging	0.8	3
	II	Deteriorative Reactions and shelf life of foods		3
	III	Packaging Materials and their properties		3
	IV	Labelling and safety concerns in food pack		3
UGFT 204	**Sanitation and Hygiene**			
	I	Sanitation and Health	0.8	3
	II	Hygiene and food handling		3
	III	Environmental Sanitation		3
	IV	Hygiene Practices and Sanitation regulations and Standards		3
UGFT 205	**Principles of Food Preservation-II**			
	I	Preservation by using Preservatives	0.8	3
	II	Preservation by radiation		3
	III	Preservation by fermentation		3
	IV	Preservation of Different Foods		3
UGFT 206	**Ice-cream technology**			
	I	Introduction to Ice-cream	0.8	3
	II	Constituents of Ice-cream		3

	III	Instruments in manufacturing ice-cream		3
	IV	Effect of process treatments on ice cream		3
UGFT 207	**Food QA and QC**			
	I	Concept of quality	0.8	3
	II	Concepts of quality management		3
	III	HACCP system		3
	IV	Food Quality Laws and Regulations		3
UGFTP02	-	Food Processing Practical-II	4	20

F. Y. B. Voc. Food Technology

Semester I

Paper title: Communication Skills in English and Computer Skills

Paper Code: UGFT 101

Objectives:

1. The course aims at training students in the usage of English Language in various contexts and enabling them to communicate effectively in English.
2. The course also aims at training students to use the computer.
3. To re-introduce students to the basics of English grammar so that they may comprehend, speak and write grammatical correct English.
4. To enable the students to speak English confidently and effectively in a wide variety of situations.
5. To facilitate the students to make functional use of IT skills in teaching – learning process.

Unit 1.1 Grammar and Listening (15L)

Articles, The Verb, Active and Passive Voice, Tenses, Concord, Modal Auxiliaries, The Adverb, The Preposition, Conjunction, Idioms, Phrasal Verbs, Direct and Indirect Speech, Active listening, Barriers to listening, Listening and note taking, listening to announcements, Listening to news on the radio and television

Unit 1.2: Speaking, Reading & Writing (15L)

Brief introduction to the Phonetic script, Falling and rising tones, participating in conversations, Small Talk, Making a short formal speech, telephone skills. Reading: theory and Practice, Scanning, Surveying a textbook using an index, Reading for information, Understanding text structure, Locating main points, Making inferences, Reading graphics, Reading for research, Describing people, place, events and things, Short Stories, Vocabulary and Comprehension, Guide to letter writing, Writing a Letter of Application and CV/ Resume, Interview Technique.

Unit 1.3: Information Concepts and Processing (15L)

Evolution of information processing, Data, Information language and communication. Elements of a computer processing system: Hardware-CPU, storage devices and media. VDU, Input-output devices, data communication equipment. Software-System software, Application software.

Unit 1.4: Computers and Communication (15L)

Concept as resource manager and coordinator of processor, devices and memory. Command interpreter, typical commands of DOS/ UNIX/ Netware, GUI-Windows, Single user, multi-user, workstation, and client server systems. Computer networks, Network protocols. LAN, WAN, Services offered by Internet.

References-

1. Sethi, Anjanee&Bhavana Adhikari. *Business Communication*. New Delhi: Tata McGraw Hill Tickoo, Champa& Jaya Sasikumar. *Writing with a Purpose*. New York: OUP, 1979.
2. Sonie, Subhash C. *Mastering the Art of Effective Business Communication*. New Delhi:Student Aid Publication, 2008.
3. Herekar, Praksh. *Business Communication*. Pune: Mehta Publications, 2007.
4. Herekar, Praksh. *Principals of Business Communication*. Pune: Mehta Publications, 2003. Rai, Urmila& S. M. Rai.*Business Communication*. Himalaya Publishing House, 2007.
5. Pradhan, N. S. *Business Communication*. Mumbai: Himalaya Publishing House, 2005.
6. Pardeshi, P. C. *Managerial Communication*. Pune: Nirali Prakashan, 2008.

Paper title: Introduction to Foods

Paper Code: UGFT 102

Objectives:

- To study about the major and minor components of food and their properties
- To know about the different methods of cooking foods
- To study the classification, structure and chemistry of the various food components.
- To understand the changes that occurs in the different constituents during storage and ways and means to prevent it.

Unit 2.1: Concept of Food and their functions (3L)

Concept of food, food science, Objectives of food science, Food Chemistry and Basic nutritional classification (Water; Carbohydrates; Proteins; Fats and oils), Pigments, colours and flavours in food, structure of water molecule, moisture in foods, free water, bound water, water activity, estimation of moisture in foods, determination of moisture and water activity.

Unit 2.2: Classification of Food (3L)

Classification of different types of food on the basis of sources

Unit 2.3: Methods of cooking (3L)

Traditional cooking methods, Modern cooking methods, Objectives and importance of cooking

Unit 2.4: Food Preparation and storage (3L)

Basic terms used in food preparation, Pre-Processing for cooking, Storage of raw and cooked food.

References-

1. B. Shreelakshmi: "Food Science" (second edition), New Age International, New Delhi.
2. Swaminathan: "Text book Of Food Science", Vol-1, BAPPCO, Bangalore.
3. Devendrakumar Bhatt & Priyanka Tomar: An Introduction to Food Science, Technology & Quality Management, Kalyani Publishers.
4. Sumati R. Mudambi: Fundamentals of Food & Nutrition wiley Eastern Ltd, New Delhi.

Paper title-Introduction to Food Microbiology

Paper Code: UGFT103

Objectives:

- To understand the basic causes of food spoilage
- To study the different ways in which food spoilage occurs and the techniques to prevent it.
- To know the different spoilage agents and the ways in which they act on food.

Unit 3.1: Food as Substrate for Microorganisms (3L)

pH, Moisture requirement: the concept of water activity, Oxidation-Reduction potential, Nutrient content, Inhibitory substances and biological structure, combined effects of factors affecting growth

Unit 3.2: General principles Underlying Spoilage (3L)

Definition, types of spoilage - physical, enzymatic, chemical and biological spoilage, Mechanism of spoilage and its end products, shelf life determination.

Unit 3.3: Microorganisms important in causing food spoilage (3L)

Bacterial and fungal food spoilage, food poisoning, food borne infection, food borne intoxication. Toxins produced by *Staphylococcus, Clostridium, Aspergillu*s; Bacterial Pathogens-*Salmonella, Bacillus, Listeria, E. coli, Shigella, Campylobacter*.

Unit 3.4: Spoilage in different food groups (3L)

Food spoilage – Introduction, spoilage in cereals, vegetables and fruits, meat, eggs, poultry, fish, milk and milk products, canned foods, nuts and oil seeds, fats and oil seeds. Definition - food infection and food intoxication.

References-

1. Prakash Triveni: Food Preservation, Aadi Publication, Delhi.
2. M. Shafiur Rahman: Hand Book of Food Preservation, Marcel Dekker Inc, New York
3. McWillims and Paine: Modern Food Preservation, Surjeet Publication.

Paper title- Principles of Food Preservation-I

Paper Code: UGFT 104

Objectives:

- To understand the principles behind the various methods of food preservation.
- To know how to use these principles to preserve different types of foods.
- To study the method of action of different preservatives.

Unit 4.1: General principles of Food preservation (3L)

Methods of food preservation, Principles of food preservation, Asepsis, Removal of microorganisms, Maintenance of Anaerobic conditions

Unit 4.2: Preservation by use of High temperature (3L)

Pasteurization: Definition, types, Sterilization, Canning - history and steps involved, spoilage encountered in canned foods, types of containers used for canning foods. Food irradiation – Principles, merits and demerits, effects of irradiation and photochemical methods.

Unit 4.3: Preservation by use of Low temperature (3L)

Refrigeration - advantages and disadvantages, freezing: Types of freezing, common spoilages occurring during freezing, difference between refrigeration and freezing.

Unit 4.4: Preservation by Removal of Moisture (3L)

Drying and dehydration - merits and demerits, factors affecting, different types of drying, Concentration: principles and types of concentrated foods.

References-

1. Yoginder K Alagh: Scope for Agro processing in Indioa, Ajanta Publications.
2. Agro Based and Processed Food Products, New Delhi.
3. Niir Board: Modern Technology of Agro Processing and Agricultural Waste, National Institute of Indi Re 2000.

Paper Title- Bakery Technology-I

Paper Code: UGFT105

Objectives:

- To highlight the processing methods used in baking industries.
- To know about the various types of food products made using baking technology.
- To have a basic idea about baking manufacture and quality control.
- To know about the importance of each ingredient in the bakery and how it effects the overall product and its sensory and quality parameters.
- To be able to start a small-scale bakery unit

Unit 5.1: Introduction to bakery and Primary processing equipment used in Bakery (3L)

Importance of bakery, Important cereals used in bakery, Flour Mill, mixer, moulding machine**,** balance, packing machines, measuring glass, moulds, knifes, extruder, oven, Layout of Bakery plant

Unit 5.2: Manufacture of Sugar (3L)

Sugarcane, jaggery, khandasari sugar, raw sugar, refined sugar, white sugar, beet sugar, manufacture of sugar from sugar cane, refining of sugar.

Unit 5.3: Properties of wheat (3L)

Wheat – Properties, Quality – Hardness, Gluten strength, protein content, soundness. Methodology and approaches to evaluate bread and bread – wheat quality – processing factors, product factors.

Unit 5.4: Bread manufacturing (3L)

Characteristics of good flour used for making bread, biscuits and cakes. Ingredients used for bread manufacture, methods of mixing the ingredients, dough development methods - straight dough, sponge dough, moulding, proofing, baking, packing, spoilage, bread staling, methods to reduce bread staling and spoilage. Processing of cakes and biscuits- ingredients, development of batter, baking and packing, Spoilage in cakes and biscuits.

References-

1. W. P. Edwards: Science of Bakery Products.
2. Emmanueal Obene: Chocolate science and Technology

Paper Title- Confectionary Technology-I

Paper Code: UGFT106

Objectives:

- To highlight the processing methods used in confectionery industries.
- To know about the various types of food products made using confectionary technology.
- To have a basic idea about confectionery manufacture and quality control.
- To know about the importance of each ingredient in the confectionary and how it effects the overall product and its sensory and quality parameters.
- To be able to start a small-scale confectionery unit

Unit 6.1: Introduction to confectionery industry and primary processing equipment used in Confectionery (3L)

Characteristics of confectionary products, Types of confectionary products, Ingredients used in confectionary products, Flour Mill, mixer, molding machine, balance, packing machines, measuring glass, moulds, knifes, extruder, oven, Layout of Confectionary plant

Unit 6.2: Classification of confectionery (3L)

Sugar boiled confectionery- crystalline and amorphous confectionery, rock candy, hard candy, lemon drop, china balls, soft candy, lollypop, marshmallows, fudge, cream, caramel, toffee, lozenges, gumdrops, honeycomb candy.

Unit 6.3: Biscuit manufacturing (3L)

Processing of biscuits- ingredients, development of batter, baking and packing, Spoilage in biscuits.

Unit 6.4: Confectionary Products (3L)

Chocolate Processing, Boiled Sweets, Gelatine Sweets, Crystallized confectionery, Chewing gum processing

References-

1. Textbook of Bakery and Confectionery" by Ashokkumar Y
2. Modern Technology of Food Processing and Agro Based industries" by NIIR Board
3. "The Fundamental Techniques of Classic Bread Baking" by Matthew Septimus and French Culinary Institute

Paper Title- Food Analysis

Paper Code: UGFT 107

Objectives:

- Become knowledgeable of food components and characteristics and techniques available for their analysis.
- Be able to choose appropriate methods for the analyte and/or food system of interest and interpret analytical data including use of common calculations, and resources relevant to food analysis.
- Demonstrate oral and written communication skills to effectively communicate scientific ideas related with food analysis

Unit 7.1: Introduction to samples (3L)

Types of samples analysed, steps in analysis, choice of methods; sampling procedures, considerations and sample preparation; Evaluation of analytical data – accuracy and precision, sources of errors, specificity, sensitivity and detection limits, regression analysis, reporting results

Unit 7.2: Analysis of chemical constituents (3L)

Their characterization and significance- moisture, ash, minerals, lipids, fat, proteins, fibre, titratable acidity, starch, reducing sugars

Unit 7.3: Analysis of Food (3L)

Spectroscopic analysis of foods – basic principles, UV, visible, fluorescence. Chromatographic analysis of foods – basic principles

Unit 7.4: Microscopic analysis of foods (3L)

Analysis of vitamins, pigments, flavours, extraneous matter, pesticides and mycotoxins. Microscopic analysis of foods Other methods- potentiometry, enzymatic, immunoassays, thermal analysis. Analysis of genetically modified foods.

References-

1. A Laboratory Manual of Food Analysis" by Shalini Sehgal
2. Food Processing Operations Analysis" by H Das
3. Food Analysis: Theory and Practice" by Pomeranz / Meloan

UGFTP 01 Food Processing Practical-I

List of experiments:

1) Introduction to Laboratory Practices
2) Laboratory equipment and their usage
3) Different types of dry and moist heat cooking methods
4) Blanching of vegetables
5) Storage by using different preservatives
6) Preparation of following:
    - Bread rolls
    - Bread sticks
    - softs rolls
    - Buns
7) Introduction to drying equipments
8) Applications of driers.
9) Classification of food based on pH value and moisture content
10) Proximate analysis of foods

Semester II

Paper Title: Entrepreneurship Development and Project Management

Paper Code: UGFT 201

Objectives:

- To know about the various procedures for starting a small-scale unit of production.
- To have a basic idea about how to prepare a project to start a small-scale industry.
- To know about various agencies that can provide assistance for starting a new project.

Unit 1.1: Introduction to Entrepreneurship (15L)

Meaning, definition and concepts, characteristics, functions, entrepreneurial traits and motivation, role of entrepreneur in economic development, factors affecting entrepreneurial growth. Types of entrepreneurs - Intrapreneurship, Women entrepreneurship, significance, problems, solutions to the problems

Unit 1.2: Entrepreneurial Development Programme and Role of institutions/schemes (15L)

Objectives, Steps, Need for training- target group- Contents of the training programme- Special Agencies for Entrepreneurial Development and Training-DIC, SIDCO, SIDBI, NIESBUD, EDII, SISI, NREG Scheme- SWARNA JAYANTHI, Rozgar Yojana Schemes.

Unit 1.3: Project (15L)

Meaning, Features, Classification, Project identification, Stages in project identification, Project Life Cycle, Project formulation- Elements, Feasibility Analysis-Network Analysis-Project Planning.

Unit 1.4: Setting up of micro small and medium enterprises (15L)

Setting up of micro small and medium enterprises, location significance, Green channel, Bridge capital, Seed capital assistance, Margin money scheme, Sickness, Causes-Remedies.

References-

1. Herekar, Praksh. *Business Communication*. Pune: Mehta Publications, 2007.
2. Herekar, Praksh. *Principals of Business Communication*. Pune: Mehta Publications, 2003.
3. John, David. Group Discussions.New Delhi: Arihant Publications. Kumar, Varinder. Business Communications. New Delhi: Kalyani Publishers, 2000.
4. Rai, Urmila& S. M. Rai.*Business Communication*. Himalaya Publishing House, 2007.
5. Pradhan, N. S. *Business Communication*. Mumbai: Himalaya Publishing House, 2005.
6. Pardeshi, P. C. *Managerial Communication*. Pune: Nirali Prakashan, 2008.
7. Sethi, Anjanee&Bhavana Adhikari. *Business Communication*. New Delhi: Tata McGraw Hill Tickoo, Champa& Jaya Sasikumar. *Writing with a Purpose*. New York: OUP, 1979.
8. Sonie, Subhash C. *Mastering the Art of Effective Business Communication*. New Delhi: Student Aid Publication, 2008.
9. Whitehead, Jeoffrey & David. H Whitehead. Business Correspondence. Allahabad: Wheeler Publishing 1996.

Paper Title- Dairy Technology

Paper Code: UGFT 202

Objectives:

- To understand about the products that can be made from milk.
- To understand the processing and storage of dairy products.
- To know about the quality control measures applied in dairy industries.
- To have a basic idea about their processing and products which can be made at a small scale

Unit 2.1: Introduction to Dairy chemistry (3L)

Milk - Definition, sources, and composition of milk, factors effecting composition of milk, physiochemical properties of milk, grading of milk-definition and types of grades, collection and transportation of milk, Skim milk, evaporated milk, condensed milk, standardized milk, toned milk, double toned milk, flavoured milk, reconstituted milk.

Unit 2.2: Processing of market milk (3L)

Flowchart of milk processing, Reception, Different types of cooling systems. Clarification and filtration process, standardization- Pearson’s square method, pasteurization-LTLT, HTST

and UHT process- continuous pasteuriser, Sterilisation and Homogenisation, Cream separation- centrifugal cream separator, bactofugation.

Unit 2.3: Indigenous and Fermented milk products (3L)

Product description, methods for manufacture of butter, cheese, ice cream, khoa, channa, paneer, shrikhand, ghee. Spray drying system: dried milk- whole milk and skim milk powder. Instantization of milk.

Unit 2.4: In-Plant cleaning system (3L)

Introduction to Cleaning in- place (CIP) system - cleaning procedure, Cleaning efficiency, Methods of cleaning in food industry, cleaning solutions – Detergents, Sanitizers. SIP system of dairy plant, Personal hygiene in dairy plant.

References-

1. B. Shreelakshmi : "Food Science" (second edition), New Age International, New Delhi.
2. Swaminathan: "Text book Of Food Science", Vol-1, BAPPCO, Bangalore.
3. Devendrakumar Bhatt & Priyanka Tomar : An Introduction to Food Science, Technology & Quality Management, Kalyani Publishers.
4. Sumati R. Mudambi: Fundamentals of Food & Nutrition wiley Eastern Ltd, New Delhi.
5. Philips T E, Modern cooking for teaching and trade, Volit orient longman, Bombay

Paper Title- Packaging Technology

Paper Code: UGFT 203

Objectives:

- To familiarize with the different materials and methods used for packaging.
- To understand the technology behind packaging and packaging materials
- To have a basic idea about the materials used for food packaging and their testing.
- To know about the different forms in which a food can be packed.

Unit 3.1: Introduction to packaging (3L)

Definition, Functions of packaging – Containment, Protection, Preservation, Promotion, Convenience, Communication. Requirements of effective package, Types of food packaging- primary, secondary and tertiary packaging.

Unit 3.2: Deteriorative Reactions and shelf life of foods (3L)

Introduction, deteriorative Reactions in food- factors affecting deterioration of foods-physical changes, biological changes, chemical changes. Shelf life of foods – Definition, intrinsic and extrinsic factors controlling the rate of reactions. Shelf life determination tests.

Unit 3.3: Packaging Materials and their properties (3L)

Rigid containers- Glass, Wooden boxes, metal cans- Aluminium and tin plate containers, Semi rigid containers- paperboard cartons, Flexible packaging- paper, plastic pouches- Low density polyethylene, High density polyethylene and Polypropylene. Packaging materials for dairy products, bakery and confectionary, granular products, fruits and vegetables, Aseptic packaging, Active packaging, Intelligent packaging, modified atmospheric packaging and controlled atmospheric packaging, shrink packaging, stretch packaging, Biodegradable packaging, Edible packaging, Tetrapacks

Unit 3.4: Labelling and safety concerns in food pack(3L)

Printing process, inks, adhesives, labelling, coding- bar codes**,** Food packaging closures of glass and plastic containers, Legislative and safety aspects of food packaging, Machineries used in Food Packaging, Package testing-Thickness – Paper density - Basis weight – Grammage - Tensile Strength - Gas Transmission Rate (GTR) - Water Vapour Transmission Rate (WVTR).

References-

1. Prakash Triveni: Food Preservation, Aadi Publication, Delhi.
2. M. Shafiur Rahman: Hand Book of Food Preservation, Marcel Dekker Inc, New York
3. McWillims and Paine: Modern Food Preservation, Surjeet Publication.
4. Fellows, P. and Ellis H, 1990 Food Processing Technology: Principles and Practicals, New York
5. NPCS Board, Modern Technology on Food Preservation
6. B. Sivasankar: Food Processing and Preservation

Paper Title- Sanitation and Hygiene

Paper Code: UGFT 204

Objectives:

- To know the principles and applications of sanitation in food industry.
- To know about the various types of Sanitation techniques applicable in the food industry
- To gain an understanding of food hygiene, sanitation and safety during food processing unit operations.

Unit 4.1: Sanitation and Health (3L)

Definition, importance of sanitation, application of sanitation to food industry and food service establishments. Microorganisms and their characteristics, control of microbial growth in food. Food contamination and spoilage, food borne diseases.

Unit 4.2: Hygiene and food handling (3L)

Purchasing and receiving safe food, food storage, sanitary procedures in food preparation, serving and displaying of food, special food operations.

Unit 4.3: Environmental Sanitation (3L)

Location and layout of premises, constructional details, sanitary requirements for equipment, guidelines for cleaning equipment, cleaning procedures, pest control, water supply, storage and waste disposal, environmental pollution, Fumigation.

Unit 4.4: Hygiene Practices and Sanitation regulations and Standards(3L)

Introduction, necessity, personnel hygiene, sanitary practices, management and sanitation, safety at work place, regulatory agencies, control of food quality, local health authority. Food sanitation check lists**.**

References-

1. Kader A A: Post Harvest Technology of Horticulture crops. 2nd edition, University of California
2. Salunkhe D K and Kadam S S: handbook of world food legumes, CRC Press, Florida
3. Niir Board: Modern Technology of Agro Processing and Agricultural Waste, National Institute of Indi Re 2000.
4. Salunkhe D K, Chavan J K, Adsule R N and Kadam S: World oilseed chemistry, technology and utilization, VNR, New York

Paper Title- Food preservation II

Paper Code: UGFT 205

Objectives:

- To study the different ways in which food spoilage occurs and the techniques to prevent it.
- To know the different spoilage agents and the ways in which they act on food.
- To understand the principles behind the various methods of food preservation.
- To know how to use these principles to preserve different types of foods.
- To study the method of action of different preservatives.

Unit 5.1: Preservation by using Preservatives (3L)

Food preservation: Definition, principles, importance of food preservation, traditional and modern methods of food preservation. Food additives – definition, types, Class I and Class II preservatives

Unit 5.2: Preservation by radiation (3L)

Ultraviolet radiation, Ionizing radiations, gamma rays and cathode rays, Microwave processing**, Ultrasonics**, High pressure and Membrane Technology.

Unit 5.3: Preservation by fermentation (3L)

Curing and Pickling; Smoking, Controlled and modified atmospheric storage. Chemical preservatives, bio preservatives, antimicrobials; hurdle technology.

Unit 5.4: Preservation of Different Foods (3L)

Cereal and products, Sugar products, Vegetables, Fruits, Meat and products,Fish and other products, Eggs, Poultry, Milk and products, Canned Foods.

References-

1. John Kingslee: A professional text to bakery and confectionary, New Age International Publication.
2. NIIR Board: The complete technology book on bakery products
3. W. P. Edwards: Science of Bakery Products.
4. Emmanuel Obene: Chocolate science and Technology

Paper Title- Ice-cream technology

Paper Code: UGFPT 206

Objectives:

- To study the different ways of manufacturing ice cream
- To know the constituents of ice cream.
- To know the packaging methods of ice cream.
- To know the Manufacturing of indigenous frozen dessert

Unit 6.1: Introduction to Ice-cream (3L)

History, development and status of ice-cream industry, Definition, composition and nutritive value of icecream, Classification and standard of ice-cream, Frozen yogurt

Unit 6.2: Constituents of Ice-cream (3L)

Role of milk constituents in manufacturing of icecream, Study and role of dairy and non-dairy ingredients in ice-cream, Study of stabilizers and emulsifiers, their classification, properties and role in quality of ice-cream. Technological aspects of ice cream manufacture, Thermodynamics of freezing and calculation of refrigeration loads,

Unit 6.3: Instruments in manufacturing ice-cream (3L)

Types of freezers, refrigeration control / instrumentation manufacturing of ice-cream, physico-chemical properties of ice-cream mix and effect of processing on physico- chemical properties of ice- cream mixes and ice- cream, Hygiene, cleaning and sanitation of ice cream plant

Unit 6.4: Effect of process treatments (3L)

Effect of process treatments on the physico chemical properties of ice-cream mixes and ice cream, over run in ice-cream and their control Packaging, hardening, Aging and mixing, storage and transportation of ice-cream, Defect in ice-cream, their causes and prevention, a} kulfi b} malai ka burf c} milk ices and lollies. d} milk shake, Recent advances in icecream industry and plant management, Technology for preparation of dried icecream milk mix. And Nutritive value of icecream.

References-

1. Hand Book Of Ice Cream Technology & Formulae Paperback – 2008

Paper Title- Food QA and QC

Paper Code: UGFT 207

Objectives:

- To understand the principles and framework of food safety.
- To understand food laws and regulations governing the quality of foods.
- To apply preventive measures and control methods to minimize microbiological hazards and maintain quality of foods.
- To identify the wide variety of parameters affecting food quality.
- To understand about Intellectual property rights.

Unit 7.1: Concept of quality (3L)

Quality attributes- physical, chemical, nutritional, microbial, and sensory; their measurement and evaluation; Sensory *vis-àvis* instrumental methods for testing quality.

Unit 7.2: Concepts of quality management (3L)

Objectives, importance and functions of quality control, Quality management systems in India, Sampling procedures and plans, Food Safety and Standards Act, 2006, Domestic regulations, Global Food safety Initiative, Various organizations dealing with inspection, traceability and authentication, certification and quality assurance - PFA, FPO, MMPO, MPO, AGMARK, BIS; Labeling issues, International food standards.

Unit 7.3: HACCP system (3L)

Hazard analysis Critical Control Point: Definition, principles, Guidelines for the application of HACCP system.

Unit 7.4: Food Quality Laws and Regulations (3L)

Quality assurance, Total Quality Management, GMP/GHP, GLP, GAP, Sanitary and hygienic practices, HACCP, Quality manuals, documentation and audits; Indian & International quality systems and standards like ISO and Food Codex, Export import policy, export documentation, Laboratory quality procedures and assessment of laboratory performance, Applications in different food industries, Food adulteration and food safety.

References-

10 years of integrated food law

UGFTP 02 Food Processing Practical-II

List of experiments:

1. Preparation of following
   - Dahi
   - Chakka and Shrikhand
   - Butter
   - Lassi
2. Sampling and testing of Milk and Milk Products
3. Measurement of thickness of packaging materials
4. Testing of chemical resistance of packaging materials
5. Storage of vegetables by pickling
6. Storage of food by canning
7. Preparation of sherbet, ice-cream
8. Storage of food by pasteurization
9. Comparison of different methods of food preservation
10. Use of chemicals as sanitizers

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