Avinashilingam Institute for Home Science and Higher Education for Women
(Deemed to be University under Category 'A' by MHRD, Estd. u/s 3 of UGC Act 1956)
Re-accredited with 'A++' Grade by NAAC. Recognised by UGC under Section 12 B
Coimbatore - 641 043, Tamil Nadu, India

Department of Food Processing and Preservation Technology

B.Voc. Food Processing and Engineering

Scheme of Instruction & Examination

(for students admitted from 2022-23 & onwards)

Part	*Subject Code*	*Name of paper/component*	*Instruction periods / week*		*Scheme of Examination*				
			Theory	*Practical/ Field work*	*Duration of exam*	*CIA*	*CE*	*Total*	*Credit*
		First Semester							
I		**Language**							
	22VLEN01	Communicative English	2	0/2	3	50	50	100	3
II		**Core Courses**							
	22VFPC01	Introduction to Food Science and Technology	2	0/2	3	50	50	100	3
	22VFPC02	Fruit and Vegetable Processing Technology	2	0/2	3	50	50	100	3
	22VFPC03	Bakery and Confectionery Technology	2	0/2	3	50	50	100	3
III		**Skill Training**							
	22VFPS01	Skill Training In Industry	8	0/20	3	50	50 (SSC)	100	18
		Non Credit Mandatory Course (NCMC)							
	22BVNSS1	NSS - I				100	-	100	Remarks
		Second Semester							
I		**Language**							
	22VLEN02	Professional English	2	0/2	3	50	50	100	3
II		**Core Courses**							
	22VFPC04	Microbiology in Food Processing and Preservation	2	0/2	3	50	50	100	3
	22VFPC05	Entrepreneurship and New Product Development	2	0/2	3	50	50	100	3
	22VFPC06	Food Standards and Labeling	2	0/0	3	50	50	100	2
	22VFPC07	Food Analysis Practicals	0	0/2	3	50	50	100	1
III		**Skill Training**							
	22VFPS02	Skill Training in Industry	8	0/20	3	50	50 (SSC)	100	18
		Non Credit Mandatory Course (NCMC)							
	22BVNSS2	NSS - II				100	-	100	Remarks
		Third Semester							
II		**Core Courses**							
	22VFPC08	Unit operations in Food Processing	3	0/2	3	50	50	100	4
	22VFPC09	Processing of Cereals, Pulses and Oil seeds	3	0/2	3	50	50	100	4
	22VFPC10	Meat and Poultry Processing Technology	3	0/2	3	50	50	100	4

III		**Skill Training**							
	22VFPS03	Baking Technology	4	0/10	3	50	50	100	9
	22VFPS04	Skill Training in Industry	4	0/10	3	50	50	100	9
		Non Credit Mandatory Course (NCMC)							
	22BVNSS3	NSS - III				100	-	100	Remarks
		Fourth Semester							
II		**Core Courses**							
	22VFPC11	Fundamentals of Food Engineering	3	0/2	3	50	50	100	4
	22VFPC12	Technology of Plantation Crops and Spices	3	0/2	3	50	50	100	4
	22VFPC13	Food Packaging	3	0/2	3	50	50	100	4
III		**Skill Training**							
	22VFPS05	Food Preservation Technology	4	0/10	3	50	50	100	9
	22VFPS06	Skill Training in Industry	4	0/10	3	50	50 (SSC)	100	9
		Non Credit Mandatory Course (NCMC)							
	22BVNSS4	NSS - IV				100	-	100	Remarks
		Fifth Semester							
II		**Core Courses**							
	22VFPC14	Dairy Technology	4	0/3	3	50	50	100	6
III		**Skill Training**							
	22VFPS07	Confectionery Technology	6	0/10	3	50	50	100	11
	22VFPS08	Skill Training in Industry	6	0/10	3	100	100	200	11
	22VFPS09	Mini Project	-	0/3	3	100	-	100	2
		Non Credit Mandatory Course (NCMC)							
	22BVNSS5	NSS - V				100	-	100	Remarks
		Sixth Semester							
II		**Core Courses**							
	22VFPC15	Principles of Nutrition	4	0/3	3	50	50	100	6
III		**Skill Training**							
	22VFPS10	Diet Therapy	6	0/2	3	50	50	100	6
	22VFPS11	Skill Training in Industry	6	0/11	3	100	100 (SSC)	200	12
	22VFPS12	Project Work	-	0/12	3	100	100	200	6
		Non Credit Mandatory Course (NCMC)							
	22BVNSS6	NSS - VI				100	-	100	Remarks

Exit Levels	**NSQF Level**	**Credits earned**	**Award**
At the end of I Semester	4	30	Certificate
At the end of I Year	5	30+30	Diploma
At the end of II Year	6	60+60	Advanced Diploma
At the end of III Year	7	60+60+60	B.Voc. Degree
	Total credits	**180**	

Avinashilingam Institute for Home Science and Higher Education for Women
(Deemed to be University under Category 'A' by MHRD, Estd. u/s 3 of UGC Act 1956)
Re-accredited with 'A++' Grade by NAAC. Recognised by UGC under Section 12 B
Coimbatore - 641 043, Tamil Nadu, India

Department of Food Processing and Preservation Technology

B.Voc. Food Processing and Engineering

Programme Outcomes (PO'S)

The Graduate will be able to

PO 1 Disciplinary Knowledge – Apply and generate the knowledge gained related to food processing techniques and skill development.

PO 2 Communication Skills - Disseminate the developed knowledge through active communications as entrepreneurs managing the team towards achievement with developed administrative skills.

PO 3 Critical Thinking - Scrutinize and evaluate the concepts associated to innovative food processing, preservation, packaging, novel product development to frame concepts with logical approach.

PO 4 Problem Solving - Recognize the significant obstacles in actual circumstances of food processing industry and relate to food waste management situation.

PO 5 Research-related Skills - Design and perform suitable practices to improve pioneering approaches to decrease the need and reduce price deserved for various food processing techniques and development process.

PO 6 Cooperation/Team work - Consider distinctive abilities and skills to custom groups and enable them to work adjoining the known ideas.

PO 7 Scientific Reasoning - Expand essential skills and character highlighting to exploration scheming and emerging food products with systematic confirmation.

PO 8 Reflective Thinking - Associate and recognize the sustainable principles and practice them for ecological handling techniques and food production.

PO 9 Information / digital Literacy- Precise the applications of the latest developments to expressive simple understanding to related facts to improve the activities in food processing, preservation and related industries.

PO 10 Self–Directed Learning - Improve innovative thinking to unite food processing industry concepts and implement for food production, waste utilization to meet greater standards and development of Indian economy.

PO 11 Lifelong Learning - Relate and improve the innovative skills, abilities and critical thinking to meet cost- effective, communal and ethnic needs and implement them to set forward trade concerned with food products.

Program Specific Outcomes (PSOs)

PSO 1: Apply appropriate technologies to develop innovations and safe food products.

PSO 2: Promote graduates for prospective career and pursue higher education.

Communicative English

Semester I **Periods of Instruction/week:2T+2P**
22VLEN01 **No. of Credits: 3**

Objectives:

- To facilitate among students fluency in spoken and written English.
- To give exposure to technical writing in English.

UNIT 1	**Listening** Listening for general information, Comprehending intended meaning, Understanding inferred meaning, Trying to listen for specific purposes.	6
UNIT 2	**Presentation** Description of an experience, Item or place individually or in groups, Preparing PPTs and explaining the key points.	6
UNIT 3	**Reading** Reading for general and specific purposes, Both silent and loud reading, Understanding words usage, Learning to use those words in conversations and in writing.	6
UNIT 4	**Writing** Writing paragraphs, Notices, Official letters, Reports, E-mails, Understanding writing etiquettes, Making outlines and summaries, Online marketing techniques.	6
UNIT 5	**Language Focus** Tenses, Prefixes, Suffixes, Verb usage, Sentence construction, Affirmative and negative sentences, Subject verb congruence, Using right words in the right place and Learning pronunciation techniques.	6
	Total hours	**30**

Practicals

1. Listening comprehension exercise through globarene software.
2. Preparation and presentation of ppt on specific topics.
3. Reading articles from newspaper clippings.
4. Writing leave/official letter, resume.
5. Pronunciation correction, sentence correction through reading exercises.

Total hours 30

References :

1. ***Nitin Bhatnagar and Mamta Bhatnagar, (2010),*** Communicative English for Engineers and Professionals.
2. ***Mandal (2006),*** Effective Communication and Public Speaking, Jaico Publishing House.
3. ***Sudharani.D (2011),*** Advanced Communication Skills Lab. Pearson Education.
4. ***Diana Hopkins and Pauline Cullen Cambridge UP (2007),*** Grammar for IELTS with answers, New Delhi.

Course Outcomes:

At the end of the course, the students will be able to:
CO1: Listen actively and comprehend the meaning
CO2: Make presentation individually or in groups
CO3 : Use appropriate words in conversation
CO4:Gain knowledge in writing skills
CO5 : Develop effective communicative skills

Introduction to Food Science and Technology

Semester I **Periods of Instruction/week:2T+2P**
22VFPC01 **No. of Credits: 3**

Objectives:

- Recognise basic composition of food groups
- Learn the changes occurred in food physical and chemical composition during processing

UNIT 1	**Introduction to food science** Basic food groups, structure, chemical and nutritional composition of cereals, cereal products, processing of cereals, changes during processing	6
UNIT 2	**Pulses, Milk and milk products** Pulses - structure, chemical and nutritional composition, pulse processing, changes during processing Milk and milk products - composition, physical and chemical properties of milk, milk processing and products	6
UNIT 3	**Vegetables and Fruits** Classification, composition and nutritive value, pigments, physical and chemical changes during processing	6
UNIT 4	**Fleshy foods** Meat, poultry, fish, egg - types, selection factor, structure, composition, nutritive value, characteristics, by-products, methods of cooking, changes during storage and processing	6
UNIT 5	**Oil seeds, spices and condiments** Nuts and oilseeds, spices and condiments -classification, composition, nutritive value, changes during processing and storage, function, health benefits and uses	6
	Total hours	**30**

Practicals

1. Introduction of food groups and determination of edible portions
2. Dry and moist heating characteristics of starch
3. Experiment on germination and malting of pulses
4. Experiment on enzymatic and non–enzymatic browning
5. Experiment on heat treatments
6. Experiment on food processing techniques

Total hours **30**

References:

1. ***ShakuntalaManay. N. &M.Shadaksharaswamy (2001),***Food Facts and Principal, New Age International Publishers, New Delhi.
2. ***Elizabeth W. Christian and Vickie A. Vaclavik,***Essentials of food science (2014), 4th edition, Springer Berlin Heidelberg, New York.
3. ***Mudgil D. and Mudgil S.B.,*** Objective of food science and technology (2017), 2nd revised enlarged edition Scientific Publishers**,** India
4. ***Srilakshmi (2011*)**,** Food Science, New Age International Publisher, New Delhi
5. ***Peter Barham,*** The Science of cooking, (2012), Springer Berlin Heidelberg, New york

Course Outcomes:

At the end of this course, students will be able to:
CO1: Classify the foods into groups and describe the composition of foods
CO2: Identify the basic food processing techniques
CO3: Interpret the changes in foods during cooking and storage

Subject Code and Name	**COs**	**Programme Outcomes (POs)**											**Program Specific Outcomes (POs)**	
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**1**	**2**
22VFPC01 Introduction to Food Science and Technology	**CO 1**	M											H	
	CO 2	H		H		H							H	
	CO 3			M					M		M			M

Fruit and Vegetable Processing Technology

Semester I **Periods of Instruction/week:2T+2P**
22VFPC02 **No. of Credits: 3**

Objectives:

- To enable the students to realize the processing of fruits and vegetables
- To learn the processed products from fruits and vegetables.

UNIT 1	**Post-harvest technology of fruits and vegetables** Post-harvest handling, maturity index of fruits and vegetables, post- harvest handling, packing and transporting, storage.	6
UNIT 2	**Fundamentals of fruits and vegetable preservation** Structure and chemical composition of fruits and vegetables, methods of preservation, dehydration, concentration, osmotic dehydration, canning, irradiation	6
UNIT 3	**Dehydration and freezing of fruits and vegetables** Dehydration of fruits and vegetables, methods of drying, heat damage, enzyme inactivation. Freezing, selection of fruits and vegetables, freezing methods	6
UNIT 4	**Food preservation by sugar and salt** Preservation by sugar and salt, selection and preparation of fruits, bulk storage of fruits, preparation of pulp, jam, jellies, ketchup, pickling, brine curing, quality analysis	6
UNIT 5	**Fruit beverages** Squashes, cordials, fruit juice concentrates, preliminary preparation of fruits, methods of preparation, fermented beverages, wine, cider, equipment in beverage industry	6
	Total hours	**30**

Practicals

1. Preparation of jam
2. Preparation of jelly
3. Preparation of ketchup
4. Preparation of pickle
5. Preparation of fruits squash
6. Preparation of fruit juice

Total hours 30

References:

1. ***ShakuntalaManay.N. &M.Shadaksharaswamy (2001),Food Facts and Principal,*** New Age International Publishers, New Delhi.
2. ***Anuradha Roy (2010)***, ***Food Processing***, Yking books publisher, Jaipur
3. ***Mahindru, S.N. (2004). Food Additives.*** Tata McGraw Hill Publishing Company Ltd, Limited, New Delhi

Course Outcomes:

At the end of this course, students will be able to:
CO1: Recall the post-harvest handling of fruits and vegetables and select appropriate preservation techniques
CO2: Apply suitable techniques to increase the shelf life of fruits and vegetables
CO3: Develop new fruit and vegetable products

Subject Code and Name	**COs**	**Programme Outcomes (POs)**											**Program Specific Outcomes (POs)**	
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**1**	**2**
22VFPC02 Fruit and Vegetable Processing Technology	**CO 1**	M		H	H			M	M	M	M		H	
	CO 2			H		H		H		H			H	
	CO 3	M		M					H	M	H			M

Bakery and Confectionery Technology

Semester I **Periods of Instruction/week: 2T+2P**
22VFPC03 **No. of Credits: 3**

Objectives:

- To Interpret common baking terms in bakery production
- To realize the processing of bakery products

UNIT 1	**Introduction** Status of bakery and confectionery industries in India, raw materials for bakery and confectionery products.	6
UNIT 2	**Bakery Products Technology -I** Selection of ingredients, role of ingredients, mixing methods, yeast leavened products, method of preparation of bread, bun, pizza, pie and its varieties	6
UNIT 3	**Bakery Products Technology -II** Selection of ingredients, role of ingredients, chemical based bakery products, method of preparation of cake and cake decoration, biscuits, cookies and its varieties.	6
UNIT 4	**Confectionery Products** Confectionery products, chocolate, fondant, caramels, fudge and toffee.	6
UNIT 5	**Bakery Equipment, Operation and Safety** Weighing equipments, mixer, blender, divider, rounder, proofer, types of oven and its operation, safe practices, plant hygiene, sanitation and standards	6
	Total hours	**30**

Practicals

1. Study on dough rising and bread making.
2. Preparation of different varieties of cakes.
3. Preparation and evaluation of cookies
4. Preparation and evaluation of candy
5. Cake decoration and application of icing
6. Preparation of chocolate varieties.

Total hours 30

References :

1. ***NIIR (2009). The complete Technology Book on Bakery Products,*** National Institute ar Industrial Research Board.
2. ***Bernard W. Minifie (1989). Chocolate, Cocoa, and Confectionery***(Science and Technology 3rd Edition.An Aspen Publication.
3. http:fssai.govt.in
4. ***Dubey. S.C. (1980). Basic Baking: Science and Craft,*** Dubey. S.C Publisher.

Course Outcomes:

At the end of this course, students will be able to:

CO1: Outline the role of ingredients in baking and explain the different methods in mixing ingredients

CO2 : Demonstrate the techniques in product preparation
CO3 : Analyse the quality of finished products

Subject Code and Name	COs	Programme Outcomes (POs)											Program Specific Outcomes (POs)	
		1	2	3	4	5	6	7	8	9	10	11	1	2
22VFPC03 Bakery and Confectionery Technology	CO 1	M		M		H		M	M		M		M	
	CO 2	M		H	M	H			M	M		M	H	
	CO 3			M		M		M	M	H		M		M

Skill Training in Industry

Semester I
22VFPS01

Periods of Instruction/week:8T+20P
No. of Credits: 18

Objectives:

- Inbuilt skill to plan and produce bakery products
- Equip to deal with challenges in product production and management

UNIT 1 **Baking of different products**

Preparation of different commercial bakery products, Planning of bakery production, utilisation of machineries, material and man power, organising bakery machines, methods of baking for different products, novel bakery products

UNIT 2 **Bakery equipments**

Unit operations of baking, machine capacity, operation procedures, pre and post cleaning and maintenance, problems and remedial measures

UNIT 3 **Food quality management**

Food standards for bakery, FSSAI, GMP, HACCP, quality analysis, process parameters, storage of finished products based on FEFO/FIFO, packaging, labelling and standards

UNIT 4 **Documentation and record keeping**

Documentation, maintenance of record keeping of raw materials, production schedule, finished products, sales and revenues, cost economics

UNIT 5 **Safety and hygiene**

Food safety and hygienic procedure of industries, selection of raw materials with respect to physical, chemical and microbiological quality , hazard management, industrial safety, fire hazards

Total hours 420

Course Outcomes:

At the end of this course, students will be able to:

CO1: Relate the theory with practical applications and construct skills related to job roles in industry
CO2: Compare the industrial preparation of products with laboratory preparations
CO3: Organise equipments for product preparation

Subject Code and Name	COs	Programme Outcomes (POs)											Program Specific Outcomes (POs)	
		1	2	3	4	5	6	7	8	9	10	11	1	2
22VFPS01 Skill Training in Industry	CO 1	M	M			H	M		M			M		H
	CO 2			H	M			M			H		M	
	CO 3			M						M			M	

Professional English

Semester II
22VLEN02

Periods of Instruction/week: 2T+2P
No. of Credits: 3

Objectives:

- To train learners in basic English fluency
- To develop English language skills.

UNIT 1	**Language through reading** Basic understanding of passage, Reading newspapers and comprehending Simple reports.	6
UNIT 2	**Focus on Language** Prefixes and Suffixes, Synonyms and Antonyms, Tenses, Use of prepositions, Subject-verb agreement, Editing, British and American English.	6
UNIT 3	**Language through Practice** Resume writing, Writing instructions and recommendations, Preparing checklists, Formal letters, Writing to officials (leave letter, seeking permission for practical training, asking for certificates, testimonials), Creative writing, Goal setting, Time management.	6
UNIT 4	**Oral practice** Public speaking skills: Compeering-Introducing a guest to the audience, welcome address, proposing a vote of thanks. Conducting conversations - listening and responding, answering according to situations.	6
UNIT 5	**Creative skills** Designing posters, Slogan/caption writing, Creating one's own posters, Designing advertisements.	6
	Total hours	**30**

Practicals

1. Reading & listening Skills- Book review/ Article reading, Listening Comprehensive exercise.
2. Oral communication through video lessons, Group Discussion, Mock Interview.
3. Language and vocabulary learning using online grammar exercises, word building etc.,
4. Creative skills - Preparation of advertisement individually on specific product/services.
5. Writing skills - Writing reports on internship experience/ reports on Incident etc.,

Total hours 30

References :

1. ***Aysha Viswamohan (2008), English for Technical Communication***, Tata McGraw Hill Publishing Co Ltd, New Delhi.
2. ***Dr. S. Sumant. (2005), English for Engineers***. Tata McGraw Hill Publishing Co Ltd, New Delhi.
3. ***M. AshrefRizvi. (2005), Effective Technical Communication.*** Tata McGraw Hill Publishing Co Ltd, New Delhi.

Course Outcomes:

At the end of this course, students will be able to:

CO1: Use English skills with reasonable competence
CO2: Know the time management and goal setting in writing
CO3: Widen professional work habits with effective collaboration
CO4 : Make wider public speaking skills
CO5: Develop creative and innovative skills through letters, posters and invitation designs.

Microbiology in Food Processing and Preservation

Semester II
22VFPC04

Periods of Instruction/week: 2T+2P
No. of Credits: 3

Objectives:

- To know the role of microorganism in food processing and preservation
- To learn the food borne disease caused by microorganism

UNIT 1	**Introduction to Microorganism** Introduction to food microbiology, role of microorganisms in the food processing and preservation, classification, types of microorganisms in foods, structure, functional role of bacteria and yeast in foods.	6
UNIT 2	**Microbial Growth** Growth of microorganism, factors influencing microbial growth in food, techniques of pure culture: serial dilution, pour plate, streak plate, spread plate, slant, broth and enrichment culture.	6
UNIT 3	**Food Spoilage** Microbial food spoilage, causes of spoilage, changes caused by microorganisms, contamination of foods, microbial spoilage of different foods and prevention of spoilage.	6
UNIT 4	**Fermented Foods** Fermentation and fermented foods, microorganisms used in food fermentation, starter cultures, fermented food products.	6
UNIT 5	**Food borne Disease** Microbial contamination in foods, infections, poisoning, and bacterial toxins, microbial control: source of microorganism, physical and chemical agents used in microbial control, disinfectants and its role	6
	Total hours	**30**

Practicals

1. Preparation and sterilization of specific types of media.
2. Preparation of agar slant
3. Streaking for isolation of organisms.
4. Selective staining techniques - gram positive and gram negative bacteria.
5. Isolation and enumeration of micro-organisms from fermented foods.
6. Isolation and enumeration of micro-organisms from spoiled foods

Total hours 30

References :

1. ***Frazier, W. C. and Westhoff. (2005). Food Microbiology,*** Tata McGraw Hill Publishing Co. Ltd., New Delhi.
2. ***James M. Jay, Martin J. Loessner and David A.Golden (2005).Modern Food Microbiology***. *7th Edition.* CBS Publishers& Distributors, New Delhi.
3. ***Ray. B. (2004). Fundamentals of Food Microbiology****,3rd Edition.* CRC Press.
4. ***Adam M.R. and Moss, M.O(2008). Food Microbiology***, New Age International Pvt. Ltd. Publishers.
5. ***Clive de W. Blackburn, Peter J. McClure (2004).****Food Borne Pathogens*: *Hazards, Risk Analysis, and Control*,CRC press

Course Outcomes:

At the end of this course, students will be able to:

CO1: Classify the hierarchy of microorganisms and knowledge on microbial spoilage

CO2: Explain the relationship between microbes and food industry

CO3: Execute subject knowledge in the work place.

Subject Code and Name	COs	Programme Outcomes (POs)											Program Specific Outcomes (POs)	
		1	2	3	4	5	6	7	8	9	10	11	1	2
22VFPC04 Microbiology in Food Processing and Preservation	CO 1	M		M		M			M			M	H	
	CO 2	M		H	M	M		M	M	M			M	
	CO 3		M	H	M		H		M		M	H		M

Entrepreneurship and New Product Development

Semester II
22VFPC05

Periods of Instruction/week: 2T+2P
No. of Credits: 3

Objectives:

- To motivate entrepreneurship in food processing
- To develop entrepreneurial skills.

UNIT 1	**Entrepreneurship in Food processing** Definition, Entrepreneurship and entrepreneur, types of entrepreneurship, qualities of an entrepreneur, identification of opportunities in food processing sector	6
UNIT 2	**Innovation and New Product development** Innovation and creativity – nature, types, phases of innovation, product concept, design, product identification, prototype and process development, product development cycle, market survey, pricing, phases in new product development, product roll – out, case study	6
UNIT 3	**Marketing Strategy** Introduction to marketing, concept of marketing, marketing methods and strategies, e-business, consumer testing and test marketing, financial accounting procedures, book keeping, market research, cost calculation, advertising methods, product - sales, license, legal specifications	6
UNIT 4	**Food Processing Factory and Plant Layout** Concept of factory design, factors affecting factory design, plant layout, floor plan sequence in food processing, different types of food industries lay outs, safety measures	6
UNIT 5	**Business Plan** Elements of business plan,business plan preparation, break event analysis, preparation of bankable project proposals	6
	Total hours	**30**

Practicals

1. Market Survey
2. Product identification and development
3. Business plan preparation
4. Marketing methods
5. Specific product development and marketing

Total hours 30

References :

1. ***Poornima M. Charantimath, (2006),****Entrepreneurship Development and Small Business Enterprise,*Dorllingkendersley publisher, Delhi
2. ***SelchoukSami(2013),****The Book on Entrepreneurship and Property: The Guide to Successful Entrepreneurship and Property*, Investment, Author house publisher

Course Outcomes:

At the end of this course, students will be able to:

CO1: Describe entrepreneurial qualities and types of entrepreneurship

CO2: Identify business opportunities and develop marketing strategies

CO3: Illustrate the food processing plant design and prepare business proposal

Subject Code and Name	COs	Programme Outcomes (POs)											Program Specific Outcomes (POs)	
		1	2	3	4	5	6	7	8	9	10	11	1	2
22VFPC05 Entrepreneurship and New Product Development	CO 1	M	H	M	M	H	H							M
	CO 2	M	M	H	M	H	H			M		M	M	
	CO 3					H		M			H	M		H

Food Standards and Labeling

Semester II **Periods of Instruction/week: 2T**
22VFPC06 **No. of Credits:2**

Objectives:

- To understand food laws and standards
- To comprehend standards for food labeling

UNIT 1 Introduction to Food Laws 6

Laws relating to food processing industries in India: MMPO, APEDA, MPEDA, AGMARK, BIS Quality systems and FSSAI. International Food Standards ISO 9000, 22000, CODEX, GRAS.

UNIT 2 **Introduction to Food Labeling** 6

Labeling: Need for labeling, labeling procedures, global labeling standards, Limitationsoflabeling safety issues.

UNIT 3 **NutritionalLabeling** 6

Nutrition information facts, labeling with desirable nutrition facts, importance of nutritional labeling, permitted levels of food additives.

UNIT 4 **Food Product Labeling** 6

Irradiated products, organic produce, genetically modified foods, care in labeling for food allergens, barcoding.

UNIT 5 **Food Standards and IPR** 6

HACCP, GLP, GMP, intellectual property rights (IPR), patents, copyrights - trade marks.

Total hours 30

References:

1. ***Ralph Blanchfield, J. 2000 . Food labeling***.Woodhead Publishing.
2. ***The Food Safety and Standards Act 2006***
3. ***Intellectual Property Today:*** *Volume 8, No. 5, May 2001, [www.iptoday.com].*
4. ***Sara Mortimore, Carol Wallace. (2013) HACCP: A Practical Approach***, Springer.
5. ***Albert (2010). Innovations in Food Labelling.***CRC Press

Course Outcomes:

At the end of this course, students will be able to:

CO1: Define food laws and standards, food labeling

CO2: Apply the food standards in industry

CO3: Adopt good manufacturing practice in industry

Subject Code and Name	COs	Programme Outcomes (POs)											Program Specific Outcomes (POs)	
		1	2	3	4	5	6	7	8	9	10	11	1	2
22VFPC06 Food Standards and Labeling	CO 1	M			M	M		M					M	
	CO 2	M		H	M	H		H	M		M			H
	CO 3	M		H			M		M		M	H		H

Food Analysis Practicals

Semester II **Periods of Instruction/week:2P**

22VFPC07 **No. of Credits: 1**

Objectives:

- To enable the students to realize the concepts of quality control for various processed products.
- To know the techniques to assess the quality of the food products

Experiments

1. Quality Analysis of fruit and vegetable-based products
2. Quality Analysis of milk and milk products.
3. Quality Analysis of beverages.
4. Methods to detect adulterants in food.
5. Experiment to detect adulterants in different food products.
6. Determination of moisture and ash content in food.
7. Determination of viscosity of food products by Brookfield Viscometer.
8. Estimation of free fatty acid value
9. Study of Spectrophotometer.
10. Study of High Performance Liquid Chromatography (HPLC).

Total hours 30

References:

1. ***S.Ranganna (1986),*** Handbook of Analysis and Quality Control for Fruit and Vegetable Products Tata McGraw-Hill Education, 1986
2. ***AOAC International. (2003). Official methods of analysis of AOAC International,***17th Ed. Gaithersburg, MD, USA, Association of Analytical Communities
3. ***Leo ML. (2004). Handbook of Food Analysis.***2nd Ed. Vols. I-III

Course Outcomes:

At the end of this course, students will be able to:

CO1: Choose appropriate techniques for quality assessment

CO2: Demonstrate the quality assessment techniques for different food groups

CO3: Interpret the food quality assessment experiments, detect adulterants in food items

Subject Code and Name	COs	Programme Outcomes (POs)											Program Specific Outcomes (POs)	
		1	2	3	4	5	6	7	8	9	10	11	1	2
22VFPC07 Food Analysis Practicals	CO 1				H			M				M	M	
	CO 2							H						H
	CO 3			M						M			M	

Skill Training in Industry

Semester II **Periods of Instruction/week: 8T+20P**

22VFPS02 **No. of Credits: 18**

Objectives:

- Inbuilt skill in commercial production of food products
- Provide exposure in industrial production management

UNIT 1 Commercial preparation of fruits and vegetable processed products

Preliminary preparation of equipments, selection of ingredients based on orders, oven handling for different products in industry and product production, Quality assessment of products and product delivery

UNIT 2 Organisation standards and norms

Roles and responsibilities in industry, standard of operating procedure in industry, safety measures required for the industry, Personal hygiene and standards

UNIT 3 Preparation and maintenance of work area

Equipments utility, materials and procedures for cleaning equipment and work area, maintaining equipments

UNIT 4 Food microbiology

Types of microbes affect the products, food spoilage, method of prevention

UNIT 5 Resource management

Resource organisation for product production, Resource management, Risk management and problem solving skills

Total hours 420

Course Outcomes:

At the end of this course, students will be able to:

CO1: Relate the theory with commercial preparation of products and organize resources for product preparation

CO2: Define the responsibilities in industrial production,

CO3: Exhibit cleanliness and hygienic practices in industry

Subject Code and Name	COs	Programme Outcomes (POs)											Program Specific Outcomes (POs)	
		1	2	3	4	5	6	7	8	9	10	11	1	2
22VFPS02 Skill Training in Industry	CO 1			M		H				M			M	
	CO 2		M	M	H		M						H	
	CO 3								M			H		H

Unit Operations in Food Processing

Semester III **Periods of Instruction/week: 3T+2P**

22VFPC08 **No. of Credits: 4**

Objectives:

- To understand the various unit operations in food industry.
- To impart the basic principles and the various applications associated with the operations

UNIT 1 Introduction to Unit Operations

	Introduction to unit operations in food processing, units and dimensions, basic principles, enthalpy, entropy,total mass balance and energy balance	9
UNIT 2	**Evaporation**	
	Evaporation, theory, classification, types, single effect evaporator, multiple effect evaporator, advantages and disadvantages, application.	9
UNIT 3	**Crystallization and Filtration**	
	Principle, nuclei formation, equipment and applications in food industries. Filtration principle, equipments, applications.	9
UNIT 4	**Size Reduction Processes**	
	Theory, size reduction methods- compression, impact, shear and cutting,equipments,applications.	9
UNIT 5	**Material Handling and Transportation**	
	Belt conveyor, screw conveyor, pneumatic conveyor, bucket elevator, grain transportation.	9
	Total hours	**45**

Practicals

1. Unit conversion
2. Experiment on falling film evaporator.
3. Performance evaluation on vacuum filter.
4. Performance evaluation of willey mill.
5. Experiment on ball mill
6. Experiment on centrifugation.

Total hours 30

References

1. ***Earle, R.L., (1983). Unit Operations in Food Processing***. Pergamon Press Ltd,
2. ***Sahay K.M and K.K.Singh (2005) Unit operations of Agricultural Processing***. Vikas house Pvt Ltd
3. ***Rao D.G. (2010).Fundamentals of Food Engineering***. PHI learning private limited, New Delhi.
4. ***Charm, S.E (1971). The fundamentals of Food Engineering***. The AVI Publishing Co.
5. ***Brennan J.G., J.R.Butters., Cowell N.D and Lilley A.E.V (1990). Food Engineering Operation***s. Elsevier publishers.

Course Outcomes:

At the end of this course, students will be able to:

CO1: Classify the fundamental units and operations.

CO2: Assess the operative mode of instruments and their purpose.

CO3: Design instruments and equipment and explain the need of instrumentation knowledge in food industries.

Subject Code and Name	COs	Programme Outcomes (POs)											Program Specific Outcomes (POs)	
		1	2	3	4	5	6	7	8	9	10	11	1	2
22VFPC08 Unit Operations in Food Processing	CO 1	H		M	M	H		M	M		M		M	
	CO 2	M	M	H			M	M		H		M	H	
	CO 3	M				H		M	M		H			H

Processing of Cereals, Pulses and Oilseeds

Semester III **Periods of Instruction/week: 3T+2P**
22VFPC09 **No. of Credits: 4**

Objectives:

- To study the processing technology of cereals, pulses and oil seeds.
- To study the storage structures and fumigation.

UNIT 1 Processing of Rice

	Structure, classification, parboiling, milling of rice, modern rice mill, polishing of rice, processed products from rice, by product utilization from rice mill	9
UNIT 2	**Processing ofWheat**	
	Structure, types, composition, quality characteristics, cleaning, tempering and conditioning, wheat milling, products from wheat.	9
UNIT 3	**Processing of Corn**.	
	Structure, types, cleaning, steeping, degermination, milling of corn, germ recovery, fibre recovery, starch gluten separation	9
UNIT 4	**Processing of Pulses and Oil seeds**	
	Varieties of pulses, pre-cleaning, pitting, oil application, conditioning, dehusking and splitting - milling process. Types of oil seeds, extraction methods, refining of oil.	9
UNIT 5	**Storage and standards**	
	Storage, insects, storage and shed, silo, fumigation and aeration, packaging, food standards and regulations of all grain products.	9
	Total hours	**45**

Practicals

1. Physical parameters of food grains.
2. Experiment on parboiling of paddy.
3. Determination of cooking quality of rice.
4. Analysis of flour quality using solvent retention capacity.
5. Determination of dough raising capacity.
6. Experiment on oil extraction.
7. Experiment on pulse processing.

Total hours 30

.

References

1. ***Chakraverty.A (1995). Post Harvest Technology of Cereals, Pulses and Oilseeds***. Oxford and IBH Publishing Co, Calcutta.
2. ***Sahay K.M and K.K.Singh (2005) Unit operations of Agricultural Processing.*** Vikas house Pvt Ltd
3. ***Samuel A.Matz (1996).The chemistry and Technology of cereals as food and feed***. S.K Jain for CBS Publishers & Distributors, New Delhi.

Course Outcomes:

At the end of this course, students will be able to:

CO1: Combine various technology for processing cereals, pulses and oilseed and classify the types

CO2: Describe the instruments and equipments used for processing.

CO3: Describe the processing of rice, wheat, corn

Subject Code and Name	COs	Programme Outcomes (POs)											Program Specific Outcomes (POs)	
		1	2	3	4	5	6	7	8	9	10	11	1	2
22VFPC09 Processing of Cereals, Pulses and Oilseeds	CO 1	H		M	M	M		M		H			H	
	CO 2	M		H			M		H			M		M
	CO 3	M		M		M			M	H		H	M	

Meat and Poultry Processing Technology

Semester III **Periods of Instruction/week: 3T+2P**
22VFPC10 **No. of Credits: 4**

Objectives:

- To understand the handling, processing, preservation of meat and poultry.
- To study the egg processing and meat plant sanitation.

UNIT 1 Introduction

	Nutritive value of meat, factors affecting quality of fresh meat, cuts of meat, structure of muscle, postmortem and biochemical changes in meat leading to rigormortis.	9
UNIT 2	**Meat preservation methods**	
	Low temperature, thermal processing, dehydration, curing and smoking. by-products from slaughter house. Processed meat products- ham and bacon, sausage, salami, meat loaves, luncheon meat, corned meat, meatbars.	9
UNIT 3	**Poultry Processing**	
	Nutritive value of poultry meat, hygienic processing of poultry, poultry cuts, slaughtering and evaluation of poultry carcasses poultry products.	9
UNIT 4	**Egg and Fish processing**	
	Composition and nutritive value of eggs, grading and preservation of eggs, manufacture of egg powder. Fish - nutritive value, types, characteristics, processing, products	9
UNIT 5	**Meat hygiene and Meat plant sanitation**	
	Zoonotic diseases transferable through meat animals, meat plant sanitation. Regulatory laws for meat industries.	9
	Total hours	**45**

Practicals

1. Preparation of meat sample
2. Determination of total fat
3. Determination of textural properties of meat
4. Determination of meat swelling capacity
5. Experiment of canned meat product.
6. Quality determination of egg.

Total hours 30

References

1. ***Fidel Toldrá,A John (2010. Handbook of Meat Processing***, Wiley & Sons, Inc., Publication.
2. ***HuiY.H., A John (2010). Handbook of Poultry Science and Technology***, ***Primary Processing***,Wiley& Sons, Inc., Publication.
3. ***Gunter Heinz, Peter Hautzinger (2007). Meat Processing Technology for Small- To Medium-Scale Producers,***Food and Agriculture Organization of the United Nations, Bangkok.

Course Outcomes:

At the end of this course, students will be able to:

CO1: Recall the nutritional profile of meat, poultry and egg, processing techniques

CO2: Explain the post mortem changes and preservation methods

CO3: Relate applicable different processing, regulatory laws of meat processing industry

Subject Code and Name	COs	Programme Outcomes (POs)											Program Specific Outcomes (POs)	
		1	2	3	4	5	6	7	8	9	10	11	1	2
22VFPC10 Meat and Poultry Processing Technology	CO 1	H		M		M			M	M		M	M	
	CO 2	H		M	M	M			M			M	H	
	CO 3	M		M	M	M		M	H		M			M

Baking Technology

Semester III **Periods of Instruction/week: 4T+ 10P**
22VFPS03 **No. of Credits: 9**

Objectives:

- To acquire hands on skill on bakery craft
- To develop entrepreneurial skills in bakery

Experiments

1. Preparation of fermented bakery products and quality assessment
2. Preparation of cake varieties
3. Cake decoration and icing varieties
4. Preparation of sugar craft and confectionery
5. Preparation of brownies and quality assessment
6. Preparation of bread rolls and quality assessment
7. Preparation of doughnut and quality assessment
8. Preparation of puff pastry varieties
9. Preparation of pizza base and varieties
10. Preparation of biscuit varieties and quality assessment

Total hours 210

Course Outcomes:
At the end of this course, students will be able to:
CO1: Relate the theoretical knowledge with practical applications
CO2: Demonstrate the preparation of quality products and develop new combination of products
CO3: Identify, analyse and resolve the problems in preparation process

Subject Code and Name	COs	Programme Outcomes (POs)											Program Specific Outcomes (POs)	
		1	2	3	4	5	6	7	8	9	10	11	1	2
22VFPS03 Baking Technology	CO 1			M	M		M			M				M
	CO 2			H		H	H		M			M	H	
	CO 3		M		H			M	M		M			M

Skill Training in Industry

Semester III **Periods of Instruction/week: 4T+ 10P**
22VFPS04 **No. of Credits: 9**

Objectives:

- Skill training in relevant food processing industry
- Provide exposure in quality assessment of products

UNIT I **Cereal, pulse and oil seed based industries**

Processing, Product production, Quality assessment of products and product delivery

UNIT II **Organisation standards and norms**

Roles and responsibilities in industry, standard of operating procedure in industry, safety measures required for the industry, Personal hygiene and standards

UNIT III **Food safety in industry**

Quality of products, controlling food safety hazards, Microbial safety, plant sanitation, product assessment

UNIT IV **Food safety in finished products**

Quality control, Packaging methods and importance of labelling

UNIT V **Resource management**

Resource organisation for product production, Resource management, Risk management and problem solving skills

Total hours 210

Course Outcomes:

At the end of this course, students will be able to:

CO1: Relate the theoretical knowledge with industrial practices
CO2: Identify the product quality and practice food safety procedures in industry
CO3: Organize resources for industrial production

Subject Code and Name	COs	Programme Outcomes (POs)											Program Specific Outcomes (POs)	
		1	2	3	4	5	6	7	8	9	10	11	1	2
22VFPS04 Skill Training in Industry	CO 1	M			M		M		M			M		M
	CO 2			H		M		M		M			M	
	CO 3		M			H	M					M	H	

Fundamentals of Food Engineering

Semester IV **Periods of Instruction/week: 3T+ 2P**
22VFPC11 **No. of Credits: 4**

Objectives:

- To learn and acquire the basic knowledge on food engineering
- To study the heat exchanger, measurement devices, refrigeration, freezing and boilers

UNIT 1	**Heat exchangers and dryers**	
	Thermal processing, classification and applications in food industries, dryers, classification and types, application in food industries.	9
UNIT 2	**Measurements and control**	
	Various process parameters, moisture content, water activity, weight, color, temperature, pressure, pH, brix, flow of fluids	9
UNIT 3	**Refrigeration and freezing**	
	Refrigeration, components of refrigeration system, refrigerants, application food freezing, types of freezers, application, cold storage	9
UNIT 4	**Steam generation and utilization**	
	Properties of steam, classification and types of boilers, maintenance of boiler and utilization steam in food industries.	9
UNIT 5	**Plant maintenance**	
	Trouble shooting in food industries, operation and maintenance of equipments, energy conservation.	9
	Total hours	**45**

Practicals

1. Experiment on measurement of moisture content using tray dryer.
2. Experiment on measurement of Pressure.
3. Experiment on measurement of pH.
4. Experiment on measurement of sugar and salt concentration.
5. Experiment on measurement of temperature.
6. Experiment on freezing of foods.
7. Experiment on Ash Content

Total hours 30

References:

1. ***R. Paulsingh, Dennis R. heldman (2009), Introduction to Food Engineering***. Elsevier publications
2. ***Rao D.G (2010), Fundamentals of Food Engineering.*** PHI learning private limited, New Delhi
3. ***Fellows P.J. (2009), Food Processing Technology: Principles and Practice.*** Wood head publishing

Course Outcomes:

At the end of this course, students will be able to:

CO1 : Summarize the importance of thermal processing used in food industries

CO2 : List the equipments used in food industry

CO3 : Combine the parameters for quantity production, achieve the quality production through the trouble shooting

Subject Code and Name	COs	Programme Outcomes (POs)											Program Specific Outcomes (POs)	
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**1**	**2**
22VFPC11 Fundamentals of Food Engineering	**CO 1**	H			M	M		M	M				M	
	CO 2		M	M			M		M	M		M	M	
	CO 3		M	H	H	M	H		M		M	M		H

Technology of Plantation Crops and Spices

Semester IV **Periods of Instruction/week: 3T+ 2P**
22VFPC12 **No. of Credits: 4**

Objectives:

- To learn the basic processing of plantation crops
- To study the processing of spices

UNIT 1	**Coffee processing**	
	Harvesting, grading, processing of coffee, wet and dry method, processing equipment, packaging, soluble /Instant coffee, use of chicory in coffee, decaffeinated coffee.	9
UNIT 2	**Tea processing**	
	Harvesting, types of tea – green, oolong and CTC; technology of CTC tea; manufacturing process for green tea and black tea	9
UNIT 3	**Cocoa processing**	
	Processing of cocoa bean, cocoa powder, cocoa butter, cocoa liquor manufacture, preparation of chocolates	9
UNIT 4	**Spice processing**	
	Types, production, pre harvest factors in processing, equipments for processing, drying, storage and packaging, medicinal uses.	9
UNIT 5	**Major spice processing**	
	Processing of pepper, cardamom, ginger, chilli, tamarind and turmeric, spice powder and paste, spice based products and storage	9
	Total hours	**45**

Practicals

1. Experiment on extraction of oleoresin.
2. Experiment on extraction of essential oil.
3. Experiment on roasting of coffee bean.
4. Experiment on drying of ginger.
5. Experiment on boiling of turmeric
6. Preparation of chocolates.
7. Preparation of spice based food mix.
8. Experiment on vacuum and gas packaging of spices

Total hours **30**

References:

1. ***NIIR. 2004. Handbook on Spices. National Institute of Industrial Research Board***, Asia Pacific Business Press Inc.
2. ***Banerjee B. 2002. Tea Production and Processing***. Oxford Univ. Press.
3. ***Minifie BW (1999), Chocolate, Cocoa and Confectionery Technology,*** 3rdEd Aspen Publishers.
4. ***Sivetz M & Foote HE (1963). Coffee Processing Technology***. AVI Publishers

Course Outcomes:
At the end of this course, students will be able to:
CO1 : Plan the plantation of various crops, able to predict the appropriate harvesting and processing
CO2 : Actualize the farmers for increasing the productivity
CO3 : Experiment in new equipments for handy uses

Subject Code and Name	COs	Programme Outcomes (POs)											Program Specific Outcomes (POs)	
		1	2	3	4	5	6	7	8	9	10	11	1	2
22VFPC12 Technology of Plantation Crops and Spices	CO 1	M		M	M			M		M	H		H	
	CO 2			M	H	M		H		M	H	M	M	
	CO 3	H		M	M		M		M		M	M		M

Food Packaging

Semester IV **Periods of Instruction/week: 3T+ 2P**
22VFPC13 **No. of Credits: 4**

Objectives:

- Understand the various properties of food packaging materials
- To study the suitable packaging material for different food substances

UNIT 1	**Introduction to packaging**	
	Introduction, definition, functions, types of packaging materials, paper, glass, tin, plastics, plate	9
UNIT 2	**Properties of packaging materials**	
	Mechanical properties, tensile strength, bursting strength, tearing resistance, puncture resistance, barrier properties of packaging materials, permeability, water vapour transmission rate.	9
UNIT 3	**Packaging equipments and machinery**	
	Form fill sealing machine, filling and capping machine, sealing machine	9
UNIT 4	**Packaging materials for foods**	
	Packaging system for dehydrated foods, frozen foods, dairy products, fresh fruits and vegetables, meat, fish, poultry, sea foods, fats and oil.	9
UNIT 5	**Standards for packaging materials**	
	Package laws and regulations, general guidelines, FSSAI standards	9
	Total hours	**45**

Practicals

1. Experiment on heat sealing
2. Experiment on tensile strength of flexible film
3. Determination of elongation of film.
4. Experiment on tensile strength of paper & paper board.
5. Experiment on testing of plastic film.
6. Experiment on bursting strength of film

Total hours **30**

References

1. ***Coles R, McDowell D &Kirwan M.J. 2003. Food Packaging Technology*** Oxford Blackwell.
2. ***Modern packaging technology.EIRI Board of Consultants and Engineers.***
3. ***Crosby NT. 1981. Food Packaging Materials***. Applied Science Publication.
4. ***Gordon L Robertson. 2006. Food Packaging: Principles and Practice*** 2Ed. CRC Press.

Course Outcomes:

At the end of this course, students will be able to:

CO1 : Define the functions of packaging, classify the different packaging materials
CO2 : Identify the packaging materials for different types of foods
CO3 : List the standards for food packaging

Subject Code and Name	COs	Programme Outcomes (POs)											Program Specific Outcomes (POs)	
		1	2	3	4	5	6	7	8	9	10	11	1	2
22VFPC13 Food Packaging	CO 1	H		M	M		M	H	M		M		M	
	CO 2	M		M		H		M		M		M	H	
	CO 3	M		M	M			M	M	H				H

Food Preservation Technology

Semester IV
22VFPS05

Periods of Instruction/week: 4T+ 10P
No. of Credits: 9

Objectives:

- To learn about the different engineering properties of foods.
- To study the methods of determining the quality and properties of different foods.

Experiments

1 Preservation of cereal products and malting
2 Preservation of pulses and legumes
3 Evaluation of pectin quality, sugar concentration (Brix), pH and acid content
4 Preservation of fruit based products - jam, jelly, marmalades, preserves, squash, tutti fruity
5 Preservation of vegetable based products - sauce, ketchup, pickles(oil, vinegar and salt based)
6 Experiments on controlling enzymatic reaction in fruit and vegetable
7 Preservation using high and low temperatures
8 Dehydrated products using different drying techniques
8 Preparation of fermented / non fermented milk products
9 Preparation of different instant mixes, commercial and traditional foods
10 Experiments on food packaging and its characteristics

Total hours 210

Course Outcomes:

At the end of this course, students will be able to:

CO 1: Recall and apply the preservation techniques in food materials
CO 2: Experiment the reactions taking place in fruits and vegetables
CO 3: Identify the properties of food, apply the processing techniques to design for food storage

Subject Code and Name	COs	Programme Outcomes (POs)											Program Specific Outcomes (POs)	
		1	2	3	4	5	6	7	8	9	10	11	1	2
22VFPS05 Food Preservation Technology	CO 1			H	M	M			M		M		H	
	CO 2	M	M					M						M
	CO 3	M		H	M	H		M	M	H		M	H	

Skill Training in Industry

Semester IV **Periods of Instruction/week: 4T+ 10P**
22VFPS06 **No. of Credits: 9**

Objectives:

- Learn total quality management in food processing industry
- Provide exposure in the quality assessment of products

UNIT I **Introduction**

Introduction to quality management-definition, scope, significance and objectives of quality management, dimensions of quality in foods, food quality evaluation techniques, quality control Vs quality assurance

UNIT II **Standard operating procedures**

Preparing scope, policy and quality objectives of food processing company, defining standard operating procedure, personal hygiene, facility and equipments, systems in laboratory accreditation

UNIT III **Audit check list**

Preparation of HACCP based on SOP checklist- personal hygiene, food preparation, food storage and dry storage, cleaning and sanitizing utensils and equipments, garbage storage and disposal and pest control

UNIT IV **Pre-requisite program**

Good manufacturing practices, personal hygiene, occupational health and safety specification, food plant sanitation management and storage

UNIT V **Food quality and food safety**

Quality of raw materials, quality checks of raw materials and work area, routine cleaning programs, microbial and fungal contamination, ingredients, equipments, product quality assurance, assessing products for quality

Total hours **210**

Course Outcomes:

At the end of this course, students will be able to:

CO1 : Relate the theoretical knowledge with practical applications

CO2 : Demonstrate industrial products production skills

CO3 : Organize resources for process, analyse the quality parameters of the products

Subject Code and Name	COs	Programme Outcomes (POs)											Program Specific Outcomes (POs)	
		1	2	3	4	5	6	7	8	9	10	11	1	2
22VFPS06 Skill Training in Industry	CO 1	M	M			M					M			
	CO 2			M		H		M				M		M
	CO 3				M		M		H	M				M

Dairy Technology

Semester V **Periods of Instruction/week: 4T+ 3P**

22VFPC14 **No. of Credits: 6**

Objectives:

- To learn the milk processing
- To study the technology of making milk based products

UNIT 1	**Composition of Milk**	12
	Classes of milk, checks for purity of milk, handling of freshly produced milk; Physical and chemical properties of milk.	
UNIT 2	**Milk Process Planning**	12
	Process of milk, milk collection and storage, weighing and checking procedures, important measures and controls. Milk handling and transportation. Dairy plant sanitation and clean in place (CIP) procedures for the plant.	
UNIT 3	**Processing of Milk**	12
	Pasteurization and sterilization principles, types, procedures and equipment; Homogenization and centrifugal cream separation.	
UNIT 4	**Milk Products**	12
	Milk products, procedures for manufacture, sterilized milk, pasteurized milk, condensed milk, spray dried milk powder, infant foods, butter, ghee, cheese, yoghurt, ice-cream, cultured and flavoured milk.	
UNIT 5	**Packaging of various Dairy Products**	12
	Packaging of different milk and milk products, different packing techniques, materials, specific characteristics and distribution	
	Total hours	**60**

Practicals

1. Organoleptic test.
2. Experiment on sample preparation.
3. Determination of titrable acidity of milk.
4. Platform test for milk – COB and heat stability test.
5. Detection and quantification of starch in milk.
6. Determination of moisture content for dairy products.
7. Determination of specific gravity of milk.
8. Study experiment on spray drying system.

Total hours 45

References:

1. ***S Kumer, De. (1980). Outline of Dairy Technology,*** Oxford University Press, New Delhi.
2. ***TufailAhama (1985). Dairy plant systems Engineering,*** KitabMahal, Allahabad.
3. ***Ananthakrishnan, C.P. and M.N. Sinha (1987, Technology and Engineering of Dairy plant operations.***Laxmi Publications, New Delhi.

Course Outcomes:

At the end of this course, students will be able to:

CO1: List the milk based products, handling

CO2: Tabulate the processing, storage condition for various milk based products.

CO3: Execute improvised quality control in the industry, appropriate use of hands on training.

Subject Code and Name	COs	Programme Outcomes (POs)											Program Specific Outcomes (POs)	
		1	2	3	4	5	6	7	8	9	10	11	1	2
22VFPC14 Dairy Technology	CO 1	H		M			M		M			M	M	
	CO 2	M		M	M	H		M		M			H	
	CO 3			M	M	M	M	M	M		M	H		H

Confectionery Technology

Semester V **Periods of Instruction/week: 6T+ 10P**
22VFPS07 **No. of Credits: 11**
Objectives:

- To study about the different preparation of confectionery products
- To study the methods of determining the quality confectionery products

Experiments

1 Stages of sugar cookery
2 Sugar boiled confectionery
3 Different types of sugar candies –zuzups and jellies
4 Crystalline confectionery
5 Fondant
6 Fudge
7 Chocolate confectionaries
8 Milk toffees
9 Fruit toffees
10 Traditional candies

Total hours 240

Course Outcomes:
At the end of this course, students will be able to:
CO1: Select quality ingredients for confectioneries
CO2: Define the stages of sugar cookery and develop new confectionery products
CO3: Demonstrate the organized production skills

Subject Code and Name	COs	Programme Outcomes (POs)											Program Specific Outcomes (POs)	
		1	2	3	4	5	6	7	8	9	10	11	1	2
22VFPS07 Confectionery Technology	CO 1			M		M					M			
	CO 2	M		M		H		M	M			M	H	
	CO 3	M	M		M		M		H	M				M

Skill Training in Industry

Semester V **Periods of Instruction/week: 6T+ 10 P**
22VFPS08 **No. of Credits: 11**

Objectives:

- Skill training in relevant food processing industry
- Provide exposure in quality assessment of products

UNIT 1 **Dairy Industry**

Processing, Product production, Quality assessment of products and product delivery

UNIT 2 **Organisation Standards and Norms**

Roles and responsibilities in industry, standard of operating procedure in industry, safety measures required for the industry, personal hygiene and standards

UNIT 3 **Cleaning in Place, Cleaning and Sanitization**

Procedure of cleaning in place process - Centralized CIP system - Operation techniques - Sanitization in CIP process - Assessment of effectiveness of cleaning and sanitizations.

UNIT 4 **Food Safety in Finished Products**

Quality control, Packaging methods and importance of labelling

UNIT 5 **Standards, Product Certification and Licensing**

Preservatives – Neutralizer - Adulterants - Detection methods - Standard specification of Milk and Milk products - Dairy product certification and licensing

Total hours **240**

Course Outcomes:

At the end of this course, students will be able to:

CO1: Recall processing of milk and its quality factors, relate the theoretical knowledge with industrial processing.

CO2: Compare laboratory processing methods with industrial processing techniques

CO3: Apply industrial processing skills

Subject Code and Name	COs	Programme Outcomes (POs)											Program Specific Outcomes (POs)	
		1	2	3	4	5	6	7	8	9	10	11	1	2
22VFPS08 Skill Training in Industry	CO 1	M	M	H		M			M			M	M	
	CO 2			M		M	M	M		M	M		M	
	CO 3				H	M			M			M		M

Mini Project

Semester V **Periods of Instruction/week: 3P**

22VFPS09 **No. of Credits: 2**

Principles of Nutrition

Semester VI **Periods of Instruction/week: 4T+ 3 P**
22VFPC15 **No. of Credits: 6**

Objectives:

- To acquire knowledge in nutrition science for health promotion
- To understand the functions, metabolism, requirements of nutrients
- To study about the vital link between nutrition and health of individuals

UNIT 1	**Introduction of nutrition, carbohydrate, fibre** Introduction to nutrition- energy - definitions of kilocalories, Joule, Energy value of foods, determination. Recommended Dietary Allowances. Carbohydrates, fibre - classification, types, function, sources, nutritional importance of carbohydrates, role of dietary fibres.	12
UNIT 2	**Protein, fats and lipids** Protein-classification, functions, sources and requirements, digestion, absorption and utilization, essential and non-essential amino acids.	12
UNIT 3	**Vitamins** Vitamins-classification, functions, sources, requirements and deficiency diseases of Vitamin A, D, E, K, Ascorbic acid, Thiamine, Riboflavin, Niacin, Pyridoxine, Pantothenic acid, Folic acid and Cyanocobalamin	12
UNIT 4	**Minerals** Minerals – classification, functions, sources, requirements, and deficiency diseases of calcium, phosphorus, magnesium, sodium, potassium, iron, copper, cobalt, zinc, iodine, manganese, fluorine, molybdenum, selenium and chromium.	12
UNIT 5	**Water balance and phytochemicals** Water balance – water body composition, functions, water- distribution, maintenance, regulation of acid-base balance in the body, adverse effects due to deficiency or excess of water intake Phytochemicals- Non-nutritive food components and their potential health benefits: polyphenols, tannins, phytates, phytoestrogens, cyanogenic compounds, lectins and saponins	12
	Total hours	**60**

Practicals

1. Qualitative tests for sugars
2. Qualitative tests for proteins
3. Qualitative tests for fats
4. Qualitative tests for vitamins
5. Qualitative tests for minerals

Total hours **45**

References :

1. ***Srilakshmi, B., Nutrition Science,*** New Age International (P) Ltd., New Delhi, 2017.
2. ***Mahtab, S, Bamji, Kamala Krishnasamy, G.N.V. Brahmam,*** Text Book of Human Nutrition, Third Edition, Oxford and IBH Publishing Co. P. Ltd., New Delhi, 2015
3. ***Swaminathan, M.,*** Advanced Textbook on Food and Nutrition, Vol. 1, Second Edition, Bangalore Printing and Publishing Co. Ltd., Bangalore, 2012.

Course Outcomes:

At the end of this course, students will be able to:

CO1: Comprehend the concept of nutrients in normal and disease conditions.

CO2: Able to theorize, implement and evaluate the functions, metabolism, requirements and effects of deficiency of nutrients.

CO3: Understand the role of food and nutrients in health and disease prevention.

Subject Code and Name	COs	Programme Outcomes (POs)											Program Specific Outcomes (POs)	
		1	2	3	4	5	6	7	8	9	10	11	1	2
22VFPC15 Principles of Nutrition	CO 1	H		M	M								M	M
	CO 2			M	H		M		H		M		H	
	CO 3			M	H							M	H	

Diet Therapy

Semester VI
22VFPS10

Periods of Instruction/week: 6T+ 2P
No. of Credits: 6

Objectives:

- Understand the role of dietician
- Gain knowledge on the principles of diet therapy and different therapeutic diets
- Develop skills to plan and prepare therapeutic diets.

UNIT 1 **Concept of Diet Therapy and Nutrition**

Role and responsibilities of dietician, therapeutic adoption of normal diet, assessment of patients needs, principles and classification of therapeutic diet, routine hospital diet, soft diet, clear liquid, full fluid diet, Dietary management of diseases.

UNIT 2 **Febrile Conditions, Obesity and Over Weight**

Aetiology and dietary management in acute, chronic and recurrent fevers. Aetiology, classification and dietary management of obesity, underweight.

UNIT 3 **GI Tract, Liver Diseases and Diet in Diabetes Mellitus**

Aetiology, symptoms, dietary management in gastritis, peptic ulcer, diarrhoea, constipation, liver diseases and diabetes mellitus.

UNIT 4 **Cardiovascular and Renal Disease**

Causes, types, symptoms, dietary management of cardiovascular hypertension, hyperlipidemia, atherosclerosis and renal diseases

UNIT 5 **Allergic condition, Cancer and Gout**

Causes, types, symptoms, dietary management of food allergy, cancer and gout, nutrition management in different diseases, nutrition counselling

Practical

1. Normal diet, Hospital diets, soft and liquid diet
2. Dietary plan –high and low calorie diet
3. Diet for different disease conditions – diabetes, cardiovascular disease etc.
4. Industrial visit / training in diet therapy and nutrition counseling

References

1. Srilakshmi (2009). Dietetics. New Age International Private Limited.
2. J., James, W.P.T. and Ralph, A (2000). Human Nutrition and Dietetics. Churchill Livingston.
3. Metta J.S. (2014) Basic Nutrition Management.Aavishkarpublishers . Mumbai

Course Outcomes:

At the end of this course, students will be able to:

CO1: Relate the causes, symptoms and onset of various types of diseases.

CO2 : Comprehend dietary principles in planning therapeutic diets for disease conditions

CO3 : Acquire professional diet counseling skills.

Subject Code and Name	COs	Programme Outcomes (POs)											Program Specific Outcomes (POs)	
		1	2	3	4	5	6	7	8	9	10	11	1	2
22VFPS10 Diet Therapy	CO 1			M	H							H	M	
	CO 2	M					M		H		M		H	
	CO 3	M	H				H							M

Skill Training in Industry

Semester VI
22VFPS11

Periods of Instruction/week: 6T+ 11P
No. of Credits: 12

Objectives:

- Inbuilt skills to manage production planning and quality assurance of the product.
- Explore new products to increase productivity in industry

UNIT 1 **Introduction**

Introduction to plant manager, role and responsibility of plant manager in food industry

UNIT 2 **Production Management**

Production planning and control, Human resource and performance management, Total quality management, Environmental management

UNIT 3 **Development of Processing Unit**

Development and implementation of operational plan, Operation functions, Principle and process involved in business, Methods to improve business process.

UNIT 4 **New Product Development**

Manage new projects/product, Quality analysis of the product, food safety, hygiene and sanitation requirements for organisation and product produced

UNIT 5 **Quality Management**

Implementation of a system for identification of hazards and assessing risk in product- HACCP, Risk analysis, GMP. Implementation of FIFO and FEFO

Total hours **255**

References

1. Production and Operations Management Paperback – 2007 by Khanna
2. The principles of product development flow, by Donald G Reinertsen, Celeritas Publishing, 2009.
3. https://www.fda.gov/downloads/Food/GuidanceRegulation/HACCP/UCM077957.pdf

Course Outcomes:

At the end of this course, students will be able to:

CO1: List the job roles in food processing industries

CO2: Formulate new value added products, examine the quality of the product

CO3: Exhibit equipment handling skills in industry

Subject Code and Name	COs	Programme Outcomes (POs)											Program Specific Outcomes (POs)	
		1	2	3	4	5	6	7	8	9	10	11	1	2
22VFPS11 Skill Training in Industry	CO 1	M	H		M		H		M	M	H	M		H
	CO 2			H		M		M					H	
	CO 3	M			M		H		H	M				M

Project Work

Semester VI
22VFPS12

Periods of Instruction/week: 12P
No. of Credits: 6