



OFFICE OF THE REGISTRAR: DIBRUGARH UNIVERSITY: DIBRUGARH
Ref. No. DU/DR-A/6-1/19/23 Dated 07.01.2019.

NOTIFICATION

The Hon'ble Vice-Chancellor, Dibrugarh University is pleased to approve the syllabi of the B.Voc Programme on Food Processing under the National Skill Qualification Framework (NSQF) Schemes of University Grants Commission (UGC) to be conducted by L.T.K. College, Azad, North Lakhimpur, Assam under report to the Under Graduate Board and Academic Council, Dibrugarh University. The syllabus is available in the website-www.dibru.ac.in.

The above shall come into effect from the Academic Session 2018-2019.

Issued with due approval.

Sd/- Dr. B.C. Borah
Joint Registrar (Academic),
Dibrugarh University

Copy to:

1. The Vice-Chancellor, D.U. for favour of information.
2. The Deans, Dibrugarh University for favour.
3. The Registrar, D.U. for favour of information.
4. The Controller of Examinations, DU, for favour of information and necessary action.
The copy of the Syllabus is enclosed herewith.
5. The Principal, L.T.K. College, Azad, North Lakhimpur, for favour of information and necessary action.
6. Sri Gunadeep Chetia, Programmer, Dibrugarh University for kind information and with a request to upload the Notification along with the syllabus in the University website.
7. File

Sd/- Dr. B.C. Borah
Joint Registrar (Academic),
Dibrugarh University

**Syllabus of B.Voc Programme
On
Food Processing**

Submitted to-

**Dibrugarh University
Dibrugarh, Assam**

Submitted by-

**L.T.K. College, Azad
North Lakhimpur, Assam**

B. VOC. On FOOD PROCESSING

Under Choice Based Credit and Semester Based System

The University Grants Commission (UGC) had launched a scheme on 27 February, 2014 for skills development based higher education as part of college/university education, leading to Bachelor of Vocation (B.Voc.) degree with multiple entry and exit points. Considering the implementation modalities, the guidelines of the scheme have been revised in the year 2015. The B.Voc. programme is focused on universities and colleges providing undergraduate studies which would also incorporate specific job roles and their NOSs along with broad based general education. This would enable the graduates completing B.Voc. to make a meaningful participation in accelerating India's economy by gaining appropriate employment, becoming entrepreneurs and creating appropriate knowledge.

1. Objectives

- a) To provide judicious mix of skills relating to a profession and appropriate content of general education.
- b) To ensure that the students have adequate knowledge and skills, so that they are work ready at each exit point of the programme.
- c) To provide flexibility to students by means of pre-defined entry and multiple exit points.
- d) To integrate NSQF within the undergraduate level of higher education in order to enhance employability of the graduates and meet industry requirements. Such graduates apart from meeting the needs of local and national industry are also expected to be equipped to become part of the global workforce.
- e) To provide vertical mobility to students coming out of:
 - i. **10+2 with arts/ Science**
 - ii. **Community Colleges.**

SEMESTER I

Course code	Title of the course	Lec.	Lab.	Total Credits	Total Hours
VFP1S01T	Bakery and Confectionery Technology	5	-	5	75
VFP1S02T	Principles of Food preservation	5	-	5	75
VFP1S03T	Food Chemistry	5	-	5	75
VFP1S04P	Bakery and Confectionery Technology (Practical)	-	3	2	60
VFP1A01T	Communication Skills in English	4	-	4	60
VFP1G01T	Food Science and Nutrition I	4	-	4	60
VFP1G02T	MIL	4	-	4	60
VFP1S01I	Internship	-	-	1	30

SEMESTER II

Course code	Title of the course	Lec.	Lab.	Total Credits	Total Hours
VFP2S05T	Dairy Technology	5	-	5	75
VFP2S06T	Packaging Technology	5	-	5	75
VFP2S07T	Sanitation and Hygiene	5	-	5	75
VFP2S08P	Dairy Technology(Practical)	-	3	2	60
VFP2A02T	Soft skill and presentation skill	4	-	4	60
VFP2G03T	Food Science and Nutrition II	4	-	4	60
VFP2G04T	Personality Development	4	-	4	60
VFP2S02I	Internship	-	-	1	30

SEMESTER III

Course code	Title of the course	Lec.	Lab.	Total Credits	Total Hours
VFP3S09T	Technology of Fish, Meat, Egg Processing	5	-	5	75
VFP3S10T	Technology of Spices and plantation crop	5	-	5	75
VFP3S11T	Technology of Fermented Foods	5	-	5	75
VFP3S12P	Chemical and microbial analysis of food (Practical)	-	3	2	60
VFP3G05T	Food Microbiology	4	-	4	60
VFP3G06T	Food additives and flavour technology	4	-	4	60
VFP3G07T	Computer Skill	4	-	4	60
VFP3S03I	Internship	-	-	1	60

SEMESTER IV

Course code	Title of the course	Lec.	Lab.	Total Credits	Total Hours
VFP4S13T	Technology of Cereal, Pulses and Oilseeds.	5	-	5	75
VFP4S14T	Technology of Beverages	5	-	5	75
VFP4S15T	Food Product design and Development	5	-	5	75
VFP4S16P	Product development (Practical)	-	3	2	60
VFP4G08T	Food Plant design	4	-	4	60
VFP4G09T	Environmental Studies	4	-	4	60
VFP4G10T	Business Management	4	-	4	60
VFP4S04I	Internship	-	-	1	-

SEMESTER V

Course code	Title of the course	Lec.	Lab.	Total Credits	Total Hours
VFP5S17T	Fruit and Vegetable Processing	5	-	5	75
VFP5S18T	Engineering properties of foods	5	-	5	75
VFP5S19T	Sensory Evaluation	5	-	5	75
VFP5S20P	Processing of fruits and vegetables(Practical)	-	3	2	60
VFP5G11T	Food Processing equipments	4	4	4	60
VFP5G12T	Computer Applications	4	-	4	60
VFP5G13T	Product and brand Management	4	-	4	60
VFP5S05I	Internship	-	-	1	30

SEMESTER VI

Course code	Title of the course	Lec.	Lab.	Total Credits	Total Hours
VFP6S21T	Unit Operations in Food Industry	5	-	5	75
VFP6S22T	Food Quality Assurance	3	-	3	45
VFP6S23T	Project and Viva Voce	8	-	10	120
VFP6G14T	Emerging Technologies in food industry	4	-	4	60
VFP6G15T	Food service management	4	-	4	60
VFP6G16T	Marketing Management	4	-	4	60

N.B: Some of the General Component syllabus is according to Dibrugarh University

Detailed Course Contents

SEMESTER I

Course code	Title of the course	Lec.	Lab.	Total Credits	Total Hours
VFP1S01T	Bakery and Confectionery Technology	5	-	5	75
VFP1S02T	Principles of Food preservation	5	-	5	75
VFP1S03T	Food Chemistry	5	-	5	75
VFP1S04P	Bakery and Confectionery Technology (Practical)	-	3	2	60
VFP1A01T	Communication Skills in English	4	-	4	60
VFP1G01T	Food Science and Nutrition I	4	-	4	60
VFP1G02T	MIL	4	-	4	60

VFP1S01I	Internship	-	-	1	30
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**VFP1S01T – Bakery and Confectionery Technology
(SKILL COURSE - 01)**

Semester I

Total Credits: 5

Total Lecture Hours: 75 (5 Hours/ Week)

Aim of the course: To impart basic and applied technology of baking and confectionery and acquaint with the manufacturing technology of bakery and confectionery products.

Syllabus Content

Unit I: Manufacture of Sugar 14 Hours

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

Unit II: Classification of confectionery 12 Hours

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 III: Properties of wheat 15 Hours

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

Unit IV: Principles of baking and Bread manufacturing 20 Hours

Major baking ingredients and their functions, role of baking ingredients in improving the quality of bread. 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.

Unit V: Cake and Biscuit manufacturing 14 Hours

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

Reference books:

- 1) Zhou. W, Hui Y,H; (2014), “Bakery Products Science and Technology”, 2nd Edition, Wiley Blackwell Publishers,
- 2) Pyler, E. J. and Gorton, L.A.(2009), “Baking Science & Technology” Vol.1 Fourth Edition, Sosland Publications.

- 3) Stanley P. Cauvain, Linda S. Young, (2008), "Baked Products: Science Technology and Practice". John Wiley & Sons Publishers.

**VFP1S02T – Principles of Food Preservation
(SKILL COURSE - 02)**

Semester I

Total Credits: 5

Total Lecture Hours: 75 (5 Hours/ Week)

Aim of the course: To make students understand about the mechanism of spoilage and deterioration in foods, the basic food preservation principles, and methods to preserve foods.

Syllabus Content

Unit I: Food Spoilage 12 Hours

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

Unit II: Preservation by using Preservatives 13 Hours

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 III: Preservation by use of high temperature 20 Hours

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 IV: Preservation by use of Low Temperature 16 Hours

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

Unit V: Preservation by Removal of Moisture 14 Hours

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

Reference Books

1. Gould, G. W. (2012), "New Methods of food preservation", Springer Science & Business Media.
2. Manay, N.S. Shadaksharaswamy, M. (2004), "Foods- Facts and Principles", New age international publishers, New Delhi.
3. Srilakshmi, B.(2003), "Food Science", New Age International Publishers, New Delhi.

4. Subalakshmi, G and Udipi, S.A.(2001),“Food processing and preservation”. New Age International Publishers, New Delhi.

VFP1S03T – Food Chemistry
(SKILL COURSE - 03)
Semester I
Total Credits: 5
Total Lecture Hours: 75 (5 Hours/ Week)

Aim of the course: To explain the chemical composition and functional properties of food.

Syllabus Content

Unit I: Water **13 Hours**

Introduction to food chemistry, structure of water molecule, hydrogen bonding, effect of hydrogen bonding on the properties of water, moisture in foods, free water, bound water, water activity, estimation of moisture in foods, determination of moisture and water activity.

Unit II: Carbohydrates **16 Hours**

Nomenclature, composition, sources, structure, reactions, functions, classification - monosaccharide, disaccharides, oligosaccharides and polysaccharides. Properties of Starch – gelatinisation, gel formation, syneresis, starch degradation, dextrinisation, retrogradation, Qualitative and quantitative tests of carbohydrates.

Unit III: Proteins **18 Hours**

Nomenclature, sources, structure, functions, classification - essential and nonessential amino acids, Physical and chemical properties of proteins and amino acids, functional properties - denaturation, hydrolysis, changes in proteins during processing. Enzymes - Specificity, mechanism of enzyme action, factors influencing enzymatic activity, controlling enzyme action, enzymes added to food during processing, enzymatic browning.

Unit IV: Fats and oils **15 Hours**

Nomenclature, composition, sources, structure, functions, classification, essential fatty acids. Physical and chemical properties - hydrolysis, hydrogenation, rancidity and flavour reversion, emulsion and emulsifiers, saponification value, acid value and iodine value, smoke point.

Unit V: Pigments, colours and flavours in food **13 Hours**

Micro nutrients: Vitamins and minerals, Pigments indigenous to food, structure, chemical and physical properties, effect of processing and storage, colours added to foods, flavours-vegetable, fruit and spice flavours, flavours of milk and meat products, effect of processing on flavour components.

Reference Books:

1. Yildiz, Fatih (2009), "Advances in Food Biochemistry", CRC Press, New York.
2. Damodaran, S., Parkin, K L., Fennema, O R., (2008), "Fennema's Food Chemistry"- 4th edition, CRC press, New York
3. Campbell, M K and Farrell, S O (2006), "Biochemistry", 5th edition, Cengage Learning Publishers, USA.
4. Manay, N.S. Shadaksharaswamy, M. (2004), "Foods- Facts and Principles", New age international publishers, New Delhi.
5. Meyer, L.H. (2002), "Food Chemistry". CBS publishers and Distributors, New Delhi.

**VFP1S04P – Bakery and Confectionery Technology (Practical)
(SKILL COURSE - 04)****Semester I****Total Credits: 2****Total Laboratory Hours: 60 (3 Hours/ Week)**

Aim of the course: To develop professional and practical knowledge in bakery and confectionery and make them competent as an entrepreneur.

Syllabus Content

- Preparation of ghee biscuits
- Preparation of melting marvels
- Preparation of sweet and salt biscuits
- Preparation of bread
- Preparation of pizza
- Preparation of hot cross buns (sweet buns)
- Preparation of jamnut cookies
- Preparation of vanilla cake
- Preparation of cake.
- Visit to production unit of a bakery.

**VFP1A01T– Communication Skills in English
(COMMON COURSE – 01)****Semester I****Total Credits: 4****Total Lecture Hours: 60 (4 Hours/ Week)**

Aim of the course: To enhance LSWR skills so that students may effectively communicate in the English language

Syllabus Content**Unit I: Grammar****12 Hours**

Articles, The Verb, Active and Passive Voice, Tenses, Concord, Modal Auxiliaries, The Adverb, The Preposition, Conjunction, Idioms, Phrasal Verbs, Direct and Indirect Speech.

Unit II: Listening

10 Hours

Active listening, Barriers to listening, Listening and note taking, Listening to announcements, Listening to news on the radio and television.

Unit III: Speaking

10 Hours

Brief introduction to the Phonetic script, Falling and rising tones, Participating in conversations, Small Talk, Making a short formal speech, telephone skills.

Unit IV: Reading

15 Hours

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.

Unit V: Writing

13 Hours

Describing people, place, events and things, Short Stories, Vocabulary and Comprehension, Guide to letter writing.

References

1. Sasikumar V, Kiranmai Dutt, P and Geetha Rajeevan (2007), "Communication Skills in English", Cambridge University Press, New Delhi.
2. Alec Fisher (2011), "Critical Thinking: An Introduction", Cambridge University Press, New Delhi.
3. Stephen Bailey, (2010), "Academic Writing: A Handbook for International Students", Routledge Publishers.
4. Ilona Leki (1998), "Academic Writing: Exploring Processes and Strategies", Cambridge University Press. New Delhi.
5. Patsy McCarthy, Caroline Hatcher (2002), "Presentation Skills: The Essential Guide for Students (Study Skills), SAGE Publishers.

**VFP1G01T – Food Science and Nutrition I
(GENERAL COURSE - 01)**

Semester I

Total Credits: 4

Total Lecture Hours: 60 (4 Hours/ Week)

Aim of the course: To understand the nutrient composition of foods, their functions, sources and to impart knowledge of concept of good health and its importance.

Syllabus Content

Unit I: Introduction to Nutrition

8 Hours

Definition of nutrition and health, inter-relationship between nutrition and health. Malnutrition: Definition and types. Reference man and reference women.

Unit II: Food and water

12 Hours

Definition of food, classification of foods based on origin, pH, nutritive value. Basic five food groups, food guide pyramid. Functions of foods. New concepts of food: health foods, ethnic foods, organic foods, functional foods, nutraceuticals, fabricated foods, extruded foods, convenience foods, junk foods, GM foods and proprietary foods. Water: functions, sources, requirement, water balance, toxicity and deficiency.

Unit III: Vitamins

15 Hours

Classification, structure, function, sources, general causes for loss in foods, bioavailability, enrichment, fortification and restoration. Units of measurement. Deficiency and toxicity disorders.

Unit IV: Minerals

10 Hours

Classification of minerals. Functions, sources, bioavailability and deficiency of the following minerals- Calcium, Iron, Iodine, Fluorine, Sodium, Potassium.

Unit V: Energy

15 Hours

Units of energy, food as a source of energy, basal metabolic rate, factors effecting BMR, total energy requirement.

Reference Books

1. James L Groff and Sareen S Gropper, (2009) “Advanced Nutrition and Human Metabolism”, Fourth Edition, Wadsworth Publishing Company.
2. Maurice B Shils, Moshe Shike A, Catherine Ross, Benjamin Cabellero, Robert J Cousins, (2006), “Modern Nutrition in Health and Disease”, Lippincott Williams al Wilkins.
3. Michael J Gibney, Ian A Macdonald and Helen M Roche (2003) “Nutrition and Metabolism”, The Nutrition Society Textbook Series, Blackwell Publishing.

SEMESTER II

Course code	Title of the course	Lec.	Lab.	Total Credits	Total Hours
VFP2S05T	Dairy Technology	5	-	5	75
VFP2S06T	Packaging Technology	5	-	5	75
VFP2S07T	Sanitation and Hygiene	5	-	5	75
VFP2S08P	Dairy Technology(Practical)	-	3	2	60
VFP2A02T	Soft skill and presentation skill	4	-	4	60
VFP2G03T	Food Science and Nutrition II	4	-	4	60

VFP2G04T	Personality Development	4	-	4	60
VFP2S02I	Internship	-	-	1	30

VFP2S05T - Dairy Technology
(SKILL COURSE - 05)
Semester II
Total Credits: 5
Total Lecture Hours: 75 (5 Hours/ Week)

Aim of the course: To inculcate the knowledge regarding various dairy products and its processing techniques.

Syllabus Content

Unit I: Introduction **15 Hours**

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.

Unit II: Processing of market milk **20 Hours**

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 III: Special milks **10 Hours**

Skim milk, evaporated milk, condensed milk, standardized milk, toned milk, double toned milk, flavoured milk, reconstituted milk.

Unit IV: Indigenous and Fermented milk products **20 Hours**

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 V: In-Plant cleaning system **10 Hours**

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. Joshi.V.K., (2015), "Indigenous Fermented Foods of South Asia", CRC Press.
2. Alan H. Varnam, (2012), "Milk and Milk Products: Technology, chemistry

- and microbiology”, Springer Science & Business Media Publishers.
3. Robinson, R. K., (2012), “Modern Dairy Technology: Volume 2 Advances in Milk Products”, Springer Science & Business Media Publishers.

VFP2S06T - Packaging Technology
(SKILL COURSE - 06)
Semester II
Total Credits: 5
Total Lecture Hours: 75 (5 Hours/ Week)

Aim of the course: To provide knowledge about trends and development in food packaging technologies and materials.

Syllabus Content

Unit I: Introduction to packaging **10 Hours**

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

Unit II: Deteriorative Reactions and shelf life of foods **10 Hours**

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 III: Packaging Materials and their properties **15 Hours**

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.

Unit IV: Special Packaging **20 Hours**

Aseptic packaging, Active packaging, Intelligent packaging, Modified atmospheric packaging and controlled atmospheric packaging, Shrink packaging, stretch packaging, Biodegradable packaging, Edible packaging, Tetrapacks.

Unit V: Labelling and safety concerns in food pack **20 Hours**

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 – Paperdensity - Basis weight – Grammage - Tensile Strength - Gas Transmission Rate (GTR) - Water Vapour Transmission Rate (WVTR).

References

1. Gordon L. Robertson (2012), “Food Packaging: Principles and Practice”, Third Edition, CRC Press.
2. Takashi Kadoya (2012), “Food Packaging”, Academic press.
3. Richard Coles, Derek McDowell, Mark J. Kirwan (2003), “Food Packaging Technology”, CRC Press.

**VFP2S07T – Sanitation and Hygiene
(SKILL COURSE - 07)
Semester II
Total Credits: 5
Total Lecture Hours: 75 (5 Hours/ Week)**

Aim of the Course: To understand and impart knowledge of importance of food hygiene, sanitation, and safety during food processing unit.

Syllabus Content

Unit I: Sanitation and Health 12 Hours

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 II: Hygiene and food handling 12 Hours

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

Unit III: Environmental Sanitation 14 Hours

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

Unit IV: Hygiene Practices in food industry 12 Hours

Introduction, necessity, personnel hygiene, sanitary practices, management and sanitation, safety at work place.

Unit V: Sanitation regulations and Standards 10 Hours

Introduction, regulatory agencies, control of food quality, local health authority. Food sanitation check lists.

References

1. Marriott, Norman (2013), "Principles of Food Sanitation", Springer Science & Business Media Publishing.
2. Roday S, (2011) (2002), "Food Hygiene and Sanitation", McGraw Hill Publishing Company Limited.
3. H. L. M. Lelieveld, John Holah, David Napper, (2014), "Hygiene in Food Processing: Principles and Practice", Elsevier Publications.

VFP2S08P – Dairy Technology (Practical)

(SKILL COURSE - 08)

Semester II

Total Credits: 2

Total Laboratory Hours: 60 (3 Hours/ Week)

Aim of the course: To develop the skills in dairy product preparation and to familiarise with the dairy plant equipments.

Syllabus Content

- Milk Testing - Platform Tests.
- Determination of Activity (Titrable Acidity) of Milk.
- Determination of fat and SNF content in milk.
- Clot on boiling test for milk.
- Determination of specific gravity of milk.
- Detection of Addition of Starch in Milk.
- Preparation of Lassi.
- Preparation of khoa.
- Preparation of Basundi.
- Preparation of chakka and shrikand.
- Preparation of kalakand.
- Preparation of cooking butter.
- Preparation of ghee.
- Preparation of flavoured milk.
- Visit to milk product development centre.

VFP2A02T– Critical Thinking, Academic Writing and Presentation Skills

(COMMON COURSE – 02)

Semester II

Total Credits: 4

Total Lecture Hours: 60 (4 Hours/ Week)

Aim of the Course: To introduce students to the concept of critical thinking, help develop analytical skills and improve academic writing and presentation skills.

Syllabus Content

Unit I: Critical Thinking

20 Hours

Introduction to critical thinking, Benefits, Barriers, Reasoning, Arguments, Deductive and inductive arguments, Fallacies, Inferential comprehension, Critical thinking in

academic writing, Elements: Clarity, Accuracy, Precision and Relevance.

Unit II: Research for Academic writing **10 Hours**

Data collection, Use of print, electronic sources and digital sources. Selecting key points, Note making, paraphrasing, summary.

Unit III: Writing Process **10 Hours**

Documentation, Plagiarism. Structure and Content: Title, Body paragraphs, Introduction and conclusion. Revising, Proof-reading.

Unit IV: Writing Models **10 Hours**

Letters, Letters to the editor, Resume and covering letters, e-mail, Seminar papers, Project reports, Notices, Filling application forms, Minutes, agenda, Essays

Unit V: Presentation Skills **10 Hours**

Soft skills for academic presentations, Effective communication skills, Structuring the presentation, Choosing appropriate medium, Flip charts, OHP, PowerPoint presentation, Clarity and brevity, Interaction and persuasion, Interview skills, Group Discussions

Reference

1. Anderson Marilyn, (2010), "Critical Thinking, Academic, Writing and Presentation Skills", Pearson Education and Mahatma Gandhi University.
2. Alec Fisher (2011), "Critical Thinking: An Introduction", Cambridge University Press, New Delhi.
3. Stephen Bailey, (2010), "Academic Writing: A Handbook for International Students", Routledge Publishers.
4. Ilona Leki (1998), "Academic Writing: Exploring Processes and Strategies", Cambridge University Press. New Delhi.
5. Patsy McCarthy, Caroline Hatcher (2002), "Presentation Skills: The Essential Guide for Students (Study Skills), SAGE Publishers.

**VFP2G03T – Food Science and Nutrition II
(GENERAL COURSE - 03)**

Semester II

Total Credits: 4

Total Lecture Hours: 60 (4 Hours/ Week)

Aim of the course: To understand about the macronutrients their functions, digest, absorption and storage mechanisms and their relationship with good health and sustenance of life.

Syllabus Content

Unit I: Body Composition**12 Hours**

Introduction, five levels of body composition, body compartments, Estimation of body composition (direct and indirect methods), Body Composition changes. Status/Length, Weight, Body Mass Index, Circumference measurements, Skin fold measurements.

Unit II: Carbohydrates**13 Hours**

Definition, classification, digestion, absorption, transport, distribution, storage and excretion. Glycemic Index and Glycemic load. Metabolic utilization and regulation of blood glucose concentration, Non- glyceemic carbohydrates- Fibre - properties, Physiological and metabolic effects, Nutritional and health significance, requirements. Resistant starch – factors influencing resistant starch content in foods and potential health benefits. Fructooligosaccharides and High Fructose Corn Syrup.

Unit III: Proteins**13 Hours**

Definition, classification of amino acids – Essential and non essential, structure of proteins, digestion, absorption, transport, distribution, storage and excretion. Protein Metabolism – Transamination, Deamination and Urea Cycle, Amino acid pool, Protein biosynthesis.

Unit IV: Lipids**13 Hours**

Definition, classification, structure, physical and chemical properties. Digestion, absorption, transport, distribution, storage and excretion Metabolism of Lipids, Cholesterol biosynthesis and regulation. Ketone bodies, Prostaglandins. Plasma lipoproteins and Hyperlipidemias. Regulation of Lipid metabolism.

Unit V: Inborn errors of metabolism**9 Hours**

Definition, Inborn errors of carbohydrate metabolism - Glycogen storage diseases, fructosuria, galactosemia. Inborn errors of protein metabolism - phenyl ketonuria, cystinuria, albinism, alkaptonuria, maple syrup disease.

References

1. James L Groff and Sareen S Gropper, (2009) “Advanced Nutrition and Human Metabolism”, Fourth Edition, Wadsworth Publishing Company.
2. Hui, Y H, (2007), “ Handbook of Food Products Manufacturing” Vol. I , Wiley-Interscience, New Jersey Publishers.
3. Maurice B Shils, Moshe Shike A, Catherine Ross, Benjamin Cabellero, Robert J Cousins, (2006), “Modern Nutrition in Health and Disease”, Lippincott Williams & Wilkins.
4. Michael J Gibney, Ian A Macdonald and Helen M Roche (2003) “Nutrition and Metabolism”, The Nutrition Society Textbook Series, Blackwell Publishing, First Edition.

**VFP2G04T – Personality Development
(GENERAL COURSE - 04)
Semester II
Total Credits: 4
Total Lecture Hours: 60 (4 Hours/ Week)**

Aim of the course: To understand the strategies for the personality development and to improve the personality of the employees upon organizational effectiveness dimensions.

Syllabus Content

Unit I: Leadership **12 Hours**

Introduction to Leadership, Leadership Power, Leadership Styles, Leadership in Administration

Unit II: Interpersonal Relations **12 Hours**

Introduction to Interpersonal Relations, Analysis of different ego states, Analysis of Transactions, Analysis of Strokes, Analysis of Life position

Unit III: Stress and Conflict Management **12 Hours**

Introduction to Stress, Causes of Stress, Impact Stress, Managing Stress. Conflict: Introduction to Conflict, Causes of Conflict

Unit IV: Time Management **12 Hours**

Time as a Resource, Identify Important Time Management Wasters, Individual Time Management Styles, Techniques for better Time Management.

Unit V: Motivation **12 Hours**

Introduction to Motivation, Relevance and types of Motivation, Motivating the subordinates, Analysis of Motivation

SEMESTER III

Course code	Title of the course	Lec.	Lab.	Total Credits	Total Hours
VFP3S09T	Technology of Fish, Meat, Egg Processing	5	-	5	75
VFP3S10T	Technology of Spices and plantation crop	5	-	5	75
VFP3S11T	Technology of Fermented Foods	5	-	5	75
VFP3S12P	Chemical and microbial analysis of food (Practical)	-	3	2	60
VFP3G05T	Food Microbiology	4	-	4	60
VFP3G06T	Food additives and flavour technology	4	-	4	60
VFP3G07T	Computer Skill	4	-	4	60
VFP3S03I	Internship	-	-	1	60

VFP3S09T – Technology of Fish, Meat and Egg Processing (SKILL COURSE - 09)

Semester III

Total Credits: 5

Total Lecture Hours: 75 (5 Hours/ Week)

Aim of the course: To understand the technology for handling, processing, preservation of meat, poultry and fish products.

Syllabus Content

Unit I: Compositional and Nutritional aspect of Animal foods 20 Hours

Fish - Classification of fish (fresh water and marine), composition, spoilage of fish - microbiological, physiological, biochemical.

Meat - Definition of carcass, concept of red meat and white meat, composition of meat, marbling in meat, post mortem

changes in meat - rigor mortis, tenderization of meat, ageing of meat.

Egg composition and nutritive value, egg proteins, characteristics of fresh egg, deterioration of egg quality.

Unit II: Fish Processing 10 Hours

Preservation of fish-Chilling, Freezing, curing, drying, salting - salting methods:

brining, pickling, curing and canning of fish. Smoking - smoke production, smoke components, quality, safety and nutritive value of smoked fish, pre - smoking processes, smoking process control.

Unit III: Meat processing

20 Hours

Meat Quality - colour, flavour, texture, Water Holding Capacity (WHC), Emulsification capacity of meat. Tests for assessment of raw meat - TVN, FFA, PV, Nitrate and nitrite in cured meat.

Preservation of meat - Refrigeration and freezing, thermal processing - canning of meat, dehydration, meat curing.

Unit IV: Egg processing

10 Hours

Egg-Composition and nutritive value. Factors affecting egg quality. Preservation of eggs- Refrigeration and freezing, thermal processing, dehydration, coating.

Unit V: Products from fish, meat and egg

15 Hours

Fishery products: Process, traditional and modern production lines, quality of products. Fish protein concentrates (FPC), fish protein extracts (FPE).

Meat products: Sausages - processing, RTE meat products.

Egg products– Egg powder, frozen egg pulp, designer eggs.

Reference

1. George M. Hall (2012), "Fish Processing Technology", Springer Science & Business Media Publication.
2. Fidel Toldra (2010), "Handbook of Meat Processing", John Wiley & Sons Publication.
3. Rao D.G. (2010), "Fundamentals of food engineering". PHI Learning Pvt. Ltd.
4. Isabel Guerrero-Legarreta (2010), "Handbook of Poultry Science and Technology, Secondary Processing", John Wiley and Sons Publication.
5. Casey M. Owens. (2010), "Poultry Meat Processing", Second Edition, CRC Press.
6. Leo M.L. Nollet and Fidel Toldra (2006), "Advanced Technologies For Meat Processing", CRC Press.

**VFP3S10T – Technology of Spices and Plantation Crops
(SKILL COURSE - 10)**

Semester III

Total Credits: 5

Total Lecture Hours: 75 (5 Hours/ Week)

Aim of the course: To impart basic knowledge about the importance and production technology of spices and plantation crops.

Syllabus Content

Unit I: Spice processing **15 Hours**

Introduction, classification, composition and functions. Major international quality specifications of spices. Spice processing, spice reconditioning, spice grinding, postprocessing treatments. Introduction to Gas chromatography, HPLC, AAS, Spectrophotometer.

Unit II: Processing of Major Spices **15 Hours**

Major spices: Pepper, cardamom, ginger, clove, nutmeg, vanilla, cinnamon, chilli and turmeric – method of manufacture; chemistry of the volatiles; enzymatic synthesis of flavour identical.

Unit III: Spice extractives **10 Hours**

Value added spice products: Spice volatile oils, spice oleoresins, Use of spice extractives, replacement of spices with oils and oleoresins, alternative products, Ground spices, processed spices, organic spices, curry powders.

Unit IV: Plantation crops- cashew processing **10 Hours**

Composition, Structure and characteristics of cashew nut, uses, Traditional method of cashew processing, General processing, Cashew apple processing, cashew by product - CNSL.

Module V: Sugarcane and Cocoa processing **15 Hours**

Production and processing of sugarcane, Cocoa: varieties, Processing of cocoa – Fermentation and Drying, storage. Manufacture of chocolate- conching, enrobing, milk chocolate, white chocolate, dark chocolate, cocoa butter, wafer coated chocolate, cocoa powder.

References

1. J.S.Purthi, (2003) (2001), “Minor Spices and Condiments: Crop Management and Post Harvest Technology”, ICAR publication, 1st Edition,
2. Handbook of Fruit Science and Technology: Production, Composition, Storage, and Processing. D. K. Salunkhe, S. S. Kadam, CRC Press, 1st Edition, 1995.
3. N.K.Jain,(1989), “Global Advances in Tea Science”, Aravali Books International, 1st Edition.

VFP3S11T – Technology of Fermented Foods
(SKILL COURSE - 11)
Semester III
Total Credits: 5
Total Lecture Hours: 75 (5 Hours/ Week)

Aim of the course: To impart thorough knowledge about various aspects of food fermentation process and technologies involved.

Syllabus Content

Unit I: Introduction to fermentation processes **12 Hours**

Range of fermentation processes – Microbial biomass, Microbial enzymes, Microbial metabolites, Recombinant products. Classification of fermentation process– Lactic acid fermentation, alcoholic fermentation. Importance of fermentation in food industry - Flavour enhancement, Nutritional value, Preservation, Antibiotic properties.

Unit II: Microbial growth kinetics **16 Hours**

Batch culture, Continuous culture, Comparison of batch and continuous culture in industrial processes - Biomass productivity, Metabolite productivity, Continuous brewing, Fed-batch culture - variable volume fed- batch culture, Fixed volume fedbatchculture, Application of fed-batch culture, Examples of the use of fed-batchculture.

Unit III: Media and Inocula for fermentation **15 Hours**

Typical media, medium formulation, water, energy sources - carbon sources, nitrogen sources, minerals. Growth factors, nutrient recycle oxygen requirements, antifoams, medium optimization. Inoculum – Criteria for transfer of inoculum, development of inocula for yeast, bacterial and mycelia process, aseptic inoculation of plantfermenters.

Unit IV: Fermented and sterilization process **15 Hours**

Instrumentation of fermenter, basic functioning of fermenter, recovery and purification of fermented products. Sterilization – Introduction, Sterilization offermenter, sterilization of feeds, sterilization of liquid wastes

Unit V: Fermented food products **17 Hours**

Fermented meat products – Cured- raw meat, semidry fermented sausages, dry – fermented sausages, mold ripened sausages. Fermented soy products – Soy sauce, fermented whole soy beans, fermented tofu, Tempeh.

Fermented vegetables – Chinese pickles, Kimchi, Sauerkraut.

Fermented cereal products – Sourdough bread, croissants, rye bread, hamburger bun, Danish pastry, beer.

References

1. Deirdre Rawlings, (2013), “Fermented Foods for Health”, Fair Winds Press.
2. Robert W. Hutkins, (2008), “Microbiology and Technology of Fermented Foods”, John Wiley & Sons.
3. Stanburry P.P. and Whitaker, A. (1984), “Principles of Fermentation Technology”. Pergamon Press, Oxford UK.
4. Steinkraus, K.H. (1983). “Handbook of Indigenous Fermented Foods”, Marcel Dekker, New York.

VFP3S12P – Chemical and Microbial Analysis of Foods (Practical) (SKILL COURSE - 12)

Semester III

Total Credits: 2

Total Laboratory Hours: 60 (3 Hours/ Week)

Aim of the course: To analyse the chemical constituents in food and to understand the basic concepts of food microbiology.

Syllabus Content

- Demonstrations of process of essential oil extraction and oleoresin of different spice
- Detection of papaya seeds in black pepper.
- Detection of powdered bran and sawdust in spices
- Preparation of fermented foods
- Introduction to the Basic Microbiology Laboratory Practices and Equipments
- Functioning and use of compound microscope
- Cleaning and sterilization of glassware
- Preparation and sterilization of nutrient broth .
- Preparation of slant, stab and plates using nutrient agar.
- Standard Plate Count Method.
- Visit to Meat Products unit

VFP3G05T – Food Microbiology

(GENERAL COURSE - 05)

Semester III

Total Credits: 4

Total Lecture Hours: 60 (4 Hours/ Week)

Aim of the Course: To make students understand the food and industrial microbiology and to make them aware about the importance of food quality control by avoiding pathogenic microbial attack.

Syllabus Content

Unit I: Introduction to food microbiology **9 Hours**

Discovery, current status, role of food microbiology, sources of micro organisms in food, changes caused by microorganisms - food fermentation, putrefaction, lipolysis. Growth and survival of microorganisms in foods, biological, chemical and physical changes caused by microorganisms, physical and chemical methods to control microorganisms.

Unit II: Characteristics of microorganisms **11 Hours**

Classification of microorganisms, nomenclature, morphology – yeast and moulds, bacterial cells, viruses. Important microbes in food, microbial growth characteristics – Microbial reproduction, nature of growth in food. Food hygiene and sanitation: Contamination during handling and processing and its control; indicator organisms.

Unit III: Food preservation **10 Hours**

Factors influencing microbial growth in food: Intrinsic and extrinsic factor -Hydrogen ion concentration, Moisture requirement, concept of water activity, temperature, oxidation reduction potential, inhibitory substances and biological structure. Principles of different food preservation methods.

Unit IV: Spoilage in different food groups **16 Hours**

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.

Unit V: Beneficial uses of microorganisms **14 Hours**

Microorganisms used in food fermentation, mechanisms of nutrient transport, application in genetics, intestinal bacteria and probiotics, food bio preservatives of bacterial origin, food ingredients and enzymes of microbial origin. Economic importance of microorganisms.

References

1. Ray, Bibek; Arun Bhunia, (2013), “Fundamental Food Microbiology”, CRC Press.
2. Adams, Martin R, Maurice O Moss, Peter McClure (2015), “Food Microbiology”, Royal Society of Chemistry, Cambridge.
3. Jay, James M. (2012), “Modern Food Microbiology”, Springer Science & Business Media., Maryland.

VFP3G06T – Food Additives and Flavour Technology
(GENERAL COURSE - 06)
Semester III
Total Credits: 4
Total Lecture Hours: 60 (4 Hours/ Week)

Aim of the course: To understand the importance of food additives in food processing technology also to study the merits and demerits of addition of food additives.

Syllabus Content

Unit I: Introduction to Food Additives **10 Hours**

Role of Food Additives in Food Processing, functions -Classification -Intentional & Unintentional Food Additives. Safety Evaluation of Food Additives, Beneficial and Toxic Effects. Food Additives - Generally recognized as safe (GRAS), Tolerance levels & Toxic levels in Foods.

Unit II: Types of food additives **15 Hours**

Preservatives, antioxidants, colours and flavours (synthetic and natural), sequesterants, humectants, hydrocolloids, sweeteners, acidulants, buffering salts, anticaking agents – uses and functions in formulations; indirect food additives.

Unit III: Flavour technology **12 Hours**

Types of flavours, flavours generated during processing – reaction flavours, flavour composites, stability of flavours during food processing, analysis of flavours, extraction techniques of flavours, flavour emulsions; essential oils and oleoresins.

Unit IV: Derived food additives **10 Hours**

Proteins, starches and lipids as functional ingredient; isolation, modification, specifications, functional properties and applications in foods and as nutraceuticals. Manufacturing and applications of fibres from food sources, fructooligosaccharides.

Unit V: Food additives as toxicants **13 Hours**

Artificial colours, preservatives, sweeteners; toxicants formed during food processing such as nitrosamines, Maillard reaction products acrylamide, benzene, heterocyclic amines and aromatic hydrocarbons; risk of genetically modified food, food supplements, persistent organic pollutants, toxicity implications of nanotechnology in food.

Reference Books

1. Titus A. M. Msagati, (2012), “The Chemistry of Food Additives and Preservatives”, John Wiley & Sons Publishers.

2. Jim Smith, Lily Hong-Shum (2011), "Food Additives Data Book", John Wiley & Sons Publishers.
3. Deshpande, S.S. (2002). "Handbook of Food Toxicology", Marcel Dekker Publishers.

SEMESTER IV

Course code	Title of the course	Lec.	Lab.	Total Credits	Total Hours
VFP4S13T	Technology of Cereal, Pulses and Oilseeds	5	-	5	75
VFP4S14T	Technology of Beverages	5	-	5	75
VFP4S15T	Food Product design and Development	5	-	5	75
VFP4S16P	Product development (Practical)	-	3	2	60
VFP4G08T	Food Plant design	4	-	4	60
VFP4G09T	Environmental Studies	4	.-	4	60
VFP4G10T	Business Management	4	-	4	60
VFP4S04I	Internship	-	-	1	-

VFP4S13T – Technology of Cereals, Pulses and Oilseeds (SKILL COURSE - 13)

Semester IV

Total Credits: 5

Total Lecture Hours: 75 (5 Hours/ Week)

Aim of the course: To acquaint with production and consumption trends, structure, composition, quality evaluation, and processing technologies for product development and value addition of various cereals, pulses and oilseeds.

Syllabus Content

Unit I : Paddy Processing

15 Hours

Composition and Quality characteristics. Curing of Paddy. Parboiling Process soaking, steaming, drying, CFTRI and pressure parboiling process, Paddy Dryer -LSU Dryer. Production of Flattened Rice and Puffed Rice from Paddy.

Unit II: Rice Milling

20 Hours

Paddy Dehusking Processes. Rice Mill Flow Chart. Engelberg Huller Mills. Modern Rice Mills – Their Components - Pre Cleaners, rubber roll Shellers, Paddy Separators – Satake type, Polishers - Cone polishers, glazing, Extraction of rice bran oil and uses of rice bran in food industry.

Unit III: Wheat milling

10 Hours

Wheat - composition and nutritional value, wheat milling process - cleaning/conditioning/hydrothermal treatment, milling-break roll and reduction rolls.

Unit IV: Milling of Pulses

10 Hours

Varieties-chemical composition and structure-dry milling and wet milling process of pulses, processed products of pulses.

Unit V: Oil seed processing

20 Hours

Introduction- methods- hydraulic press- screw press – principle and working, solvent extraction methods, Clarification, degumming, neutralization, bleaching, deodorization techniques/process, blending of oils. Hydrogenation, Fractionation, Winterization.

References

1. Dendy DAV & Dobraszczyk BJ. (2001), “Cereal and Cereal Products”, Aspen Publications.
2. Chakraverty, A. (1995), “Post Harvest Technology of Cereals, Pulses and Oilseeds”. Oxford and IBH Publishing Co, Calcutta. N.L. Kent and A.D. Evans: (1994) “Technology of Cereals” (4th Edition),
3. Elsevier Science (Pergaman), Oxford, UK, Samuel Matz: (1992), “The Chemistry and Technology of Cereals as Food and Feed”, Chapman & Hall

VFP4S14T – Technology of Beverages

(SKILL COURSE - 14)

Semester IV

Total Credits: 5

Total Lecture Hours: 75 (5 Hours/ Week)

Aim of the course: The aim of the course is to provide the students with general scientific knowledge about processing of alcoholic and non- alcoholic beverages.

Syllabus content

Unit I: Introduction to beverages

15 Hours

Types of beverages and their importance, status of beverage industry in India, Manufacturing technology for juice-based beverages, synthetic beverages; technology of still, carbonated, low-calorie and dry beverages, isotonic and sports drinks; role of various ingredients of soft drinks, carbonation of soft drinks.

Unit II: Manufacturing process of beverages **10 Hours**

Beverages based on tea, coffee, cocoa, spices, plant extracts, herbs, nuts, Dairy-based beverages.

Unit III: Types of coffee and tea **20 Hours**

Chemical composition and processing of tea and coffee and their quality assessment. Types of tea: black tea, green tea, oolong tea. Types of coffee: Vacuum coffee, drip coffee, iced coffee. Espresso coffee, instant coffee. Decaffeination of Coffee types of decaffeination: Roselius method, Swiss water process, direct and indirect method, triglyceride method, carbon dioxide method.

Unit IV: Alcoholic beverages **15 Hours**

Types, manufacture and quality evaluation; the role of yeast in beer and other alcoholic beverages, ale type beer, lager type beer, technology of brewing process, equipments used for brewing and distillation, wine and related beverages, distilled spirits.

Unit V: Packaged drinking water **15 Hours**

Definition, types, manufacturing processes, quality evaluation and raw and processed water, methods of water treatment, BIS quality standards of bottled water; mineral water, natural spring water, flavoured water, carbonated water.

Reference Books

1. Manay, N.S, Shandaksharaswamy, M., (2004), "Foods- Facts and Principles", New Age International Publishers, New Delhi,
2. Potter, N.N, Hotchkiss, J.H.(2000), "Food Science". CBS Publishers, New Delhi.
3. Srilakshmi, B. Food Science (3rd Edition) (2003), New Age International (p) Limited Publishers, New Delhi,
4. Nicholas Dege. (2011), "Technology of Bottled water". Blackwell publishing Ltd, UK.

**VFP4S15T – Food Product Design and Development
(SKILL COURSE - 15)**

Semester IV

Total Credits: 5

Total Lecture Hours: 75 (5 Hours/ Week)

Aim of the course: To demonstrate a theoretical knowledge of the basic concepts of new food product development, and to understand the process involved in the production of a new product.

Syllabus content

Unit I: Concept of product development**16 Hours**

Need, importance and objectives of formulation for new product development. Product success and failure, factors for success, process of product development, managing for product's success. Innovation strategy - possibilities for innovation, building up strategy, product development programme.

Unit II: Product development process**14 Hours**

Ideas, Formulation based on sources availability and cost competitiveness for concept developments of new products, Product strategy, product design and process development, product commercialization, product launch and evaluation.

Unit III: Knowledge base for product development technology**18 Hours**

Adaptable technology and sustainable technology for standardized formulation for process development. Knowledge and the food system, knowledge management, knowledge for conversion of product concept to new product, technological knowledge - product qualities, raw material properties, processing, packaging requirement, distribution and marketing. Process control parameters and scale up, production trials for new product development at lab and pilot scale

Unit IV: Role of consumers in product development**12 Hours**

Consumer behaviour, food preferences, avoiding acceptance, integration of consumer needs in product development and sensory needs.

Unit V: Managing the product development process**15 Hours**

Principles of product development management, people in product development management, designing the product development process, key decision points. Quality assessment: Quality assessment of new developed products. Market testing and marketing plan.

References

1. Howard R. Moskowitz, Jacqueline H. Beckley, Anna V. A. Resurreccion, (2012),
2. "Sensory and Consumer Research in Food Product Design and Development", John Wiley & Sons Publishers.
3. Kenneth B. Kahn, (2012), "The PDMA Handbook of New Product Development", John Wiley & Sons Publishers.
4. Jacqueline H. Beckley, M. Michele Foley, Elizabeth J. Topp, Jack C. Huang, Witoon Prinyawiwatkul, (2008), "Accelerating New Food Product Design and Development", John Wiley & Sons Publishers.

Semester IV
Total Credits: 4
Total Lecture Hours: 60 (4 Hours/ Week)

Aim of the course: To study design of plant and processing unit and to get a thorough knowledge about the importance of a good food plant design.

Syllabus Content

Unit I: Introduction **10 Hours**

Definition, Basic concepts of plant layout and design with special reference to food process industries. Application of HACCP concept, ISO, FPO & MPO requirements in food plant layout and design.

Unit II: Plant Location **10 Hours**

Influence of location on plant layout, location factors, location theory and models, Economic plant size, types of manufacturing processes like continuous, repetitive and intermittent processes.

Unit III: Plant Layout **10 Hours**

Preparation of a Plant Layout, Plant Layout problem, importance, objectives, classical types of layouts. Evaluation of layout. Advantages of good layout

Unit IV: Plant Building **15 Hours**

Considerations in building design, type of factory buildings, choice of building construction, material for floors, foundation, walls, doors, windows, drains etc, ventilation, fly control, mold prevention and illumination in food processing industries.

Unit V: Plant layout & Equipment Layout **15 Hours**

Plant layout and design of bakery and biscuit industries; fruits and vegetables processing industries including beverages; milk and milk products; meat, poultry and fish processing industries.

Reference Books

1. John Holah, H. L. M. Lelieveld, (2011), "Hygienic Design of Food Factories", Elsevier Publication.
2. J. Peter Clark, (2008), "Practical Design, Construction and Operation of Food Facilities", Academic Press Publishers.
3. Zacharias B. Maroulis, George D. Saravacos, (2007), "Food Plant Economics", CRC Press Publishers.
4. Antonio Lopez-Gomez, Gustavo V. Barbosa-Canovas, (2005), "Food Plant Design", CRC Press Publishers.

**VFP4G10T- Business Management
(GENERAL COURSE - 10)
Semester IV
Total Credits: 4
Total Lecture Hours: 60 (4 Hours/ Week)**

Aim: To familiarise the students with concepts and principles of Management

Syllabus Content

Unit I: Management

12 Hours

Introduction, Meaning, nature and characteristics of Management - Scope and functional areas of management - Management as a science art or profession – Management & Administration – Principles of management - Social responsibility of management.- Contributions of F. W. Taylor and Henry Fayol - Emergence of Japan as an industrial giant.

Unit II: Planning

8 Hours

Nature, importance and purpose of planning - Planning process, objectives - Types of plans MBO-Features-steps.

Unit III: Organising and Staffing

12 Hours

Nature and purpose of organisation, Principles of organisation - Types of organization, Organisation Chart- Organisation manual-Departmentation, Committees Authority- Delegation of Authority- Responsibility and accountability-Centralisation Vs decentralisation of authority - Nature and importance of staffing - Process of selection & recruitment.

Unit IV: Directing

16 Hours

Meaning and nature of directing - Motivation- meaning - importance-Theories of Motivation (Maslow s, Herzberg, McGregor s, X & Y theory) Leadership-Meaning- Styles Managerial Grid by Blake and Mouton - Likert s Four level model- Coordination- Meaning and importance.

Unit V: Controlling

14 Hours

Meaning and steps in controlling - Essentials of a sound control system - Methods of establishing control-Control by Exception.

References

1. Koontz & O Donnell, Management.
2. Appaniah & Reddy, Essentials of Management.
3. L M Prasad, Principles of management.
4. Rustum & Davan, Principles and practice of Management.

SEMESTER V

Course code	Title of the course	Lec.	Lab.	Total Credits	Total Hours
VFP5S17T	Fruit and Vegetable Processing	5	-	5	75
VFP5S18T	Engineering properties of foods	5	-	5	75
VFP5S19T	Sensory Evaluation	5	-	5	75
VFP5S20P	Processing of fruits and vegetables(Practical)	-	3	2	60
VFP5G11T	Food Processingequipments	4	4	4	60
VFP5G12T	Computer Applications	4	-	4	60
VFP5G13T	Product and brand Management	4	-	4	60
VFP5S05I	Internship	-	-	1	30

**VFP5S17T - Processing of Fruits and Vegetables
(SKILL COURSE - 17)**

Semester V

Total Credits: 5

Total Lecture Hours: 75 (5 Hours/ Week)

Aim of the course: To understand about the proper post harvest handling technologies of fruits and vegetables and to know the process of development of fruit and vegetable processing products.

Syllabus Content

Unit I: Introduction

15 Hours

Composition and nutritive value of fruits and vegetable. Factors effecting composition and quality of fruits and vegetables. Quality requirements of raw materials for processing; sourcing and receiving at processing plants, primary processing: grading, sorting, cleaning, washing, peeling, slicing and blanching.

Unit II: Spoilage of fruits and vegetables

15 Hours

Different types of spoilages in fruits and vegetables. Spoilage during storage of fruits and vegetables and their prevention. General methods of preservation of whole fruits/vegetables and processed fruits and vegetables. Spoilage of pickles. Methods of preparation, curing techniques, defects and remedies. Types of preservatives commonly used in Fruits and vegetables processing industry, limits of usage of preservatives.

Unit III: Processing of fruits and vegetables

20 Hours

Dehydration of fruits and vegetables using various drying technologies like sundrying, solar drying (natural and forced convection), osmotic, tunnel drying, fluidized bed drying, freeze drying, convectional and adiabatic drying; applications to raisins, dried figs,

vegetables, intermediate moisture fruits and vegetables. Fruit powders using spray drying. Technology of extraction of juices from different types of fruits.

Unit IV: Manufacture of Fruit products **15 Hours**

Manufacturing process of juice, soup, puree, and paste. Jams, Jellies and marmalades: selection, preparation, production. Difference between jam and jelly. Theory of jell formation, failure and remedies in jam and jelly making. General principles and manufacturing processes of preserves, candied fruits, glazed fruits, crystallized fruits

Unit V: Manufacture of vegetable products **15 Hours**

Manufacturing process of sauce, ketchup, vegetable juices and concentrated products

Reference Books

1. Nirmal Sinha, Y. H. Hui, et al; (2010), "Handbook of Vegetables and Vegetable Processing", John Wiley & Sons.
2. Olga Martin-Belloso, Robert Soliva Fortuny, (2010), "Advances in Fresh-Cut Fruits and Vegetables Processing". CRC Press.
3. W Jongen (2002), "Fruit and Vegetable Processing: Improving Quality", Elsevier Publications.

**VFP5S18T – Engineering Properties of Foods
(SKILL COURSE - 18)
Semester V
Total Credits: 5
Total Lecture Hours: 75 (5 Hours/ Week)**

Aim of the course: To understand the concept of rheological and thermal properties of foods on measuring the various engineering properties of food products.

Syllabus Content

Unit I: Physical Properties of Foods **15 Hours**

Methods of estimation of – Shape- roundness, sphericity, roundness ratio, size, volume- platform scale method, density, specific gravity- apparatus, porosity and surface area.

Unit II: Thermal Properties of Foods **15 Hours**

Definitions - specific heat, enthalpy, conductivity and diffusivity, surface heat transfer coefficient. Measurement of thermal properties like specific heat, thermal conductivity and thermal diffusivity

Unit III: Aerodynamic properties and frictional properties of Foods **15 Hours**

Aerodynamic property-definition-drag coefficient, terminal velocity - application in handling and separation of food materials. Frictional property-coefficient of friction, angle of repose, angle of internal friction, application in food handling and storage

Unit IV: Rheology and texture of foods **20 Hours**

Rheology- rheological classification-viscoelasticity-viscometers. Hookean body, St Venant body and Newtonian body. Texture of foods- methods of textural evaluation subjective and objective method- texture profile method

Unit V: Electrical, optical properties and mechanical damage **15 Hours**

Electrical and optical property- importance and its application. Mechanical damage causes of mechanical damage-methods for detection and evaluation of mechanical damage

References

1. M.A. Rao, Syed S.H. Rizvi, Ashim K. Datta, Jasim Ahmed, (2014), "Engineering Properties of Foods", Fourth Edition, CRC Press.
2. M. Anandha Rao, (2010), "Rheology of Fluid and Semisolid Foods: Principles and Applications: Principles and Applications", Springer Science & Business Media Publishing.
3. Zeki Berk, (2008), "Food Process Engineering and Technology", Academic Press Publishers.

**VFP5S19T – Sensory Evaluation of foods
(SKILL COURSE - 19)
Semester V
Total Credits: 5
Total Lecture Hours: 75 (5 Hours/ Week)**

Aim of the course: The course provides knowledge about Sensory test methods and procedures used to evaluate the flavor, color and texture of foods which helps to enhance acceptance of a product.

Syllabus Content

Unit I: Introduction **10 Hours**

Definition of sensory evaluation; basic tastes; human senses and sensory perception; threshold; psychophysics, Tongue surface

Unit II: Arrangements for Sensory Evaluation Test controls **15 Hours**

Environment and test room design; product controls: sample preparation and presentation; panelist controls; factors influencing measurements: psychological and physiological errors

Unit III: Statistical Methods for Sensory Evaluation **20 Hours**

Classification of test methods; discrimination tests: paired-comparison, duo-trio and triangle tests; affective tests: qualitative (interview and focus group) and quantitative tests (paired preference and acceptance tests); Two sample test, Ranking test, Two sample difference test, numeric scoring test, hedonic ranking test.

Unit IV: Subjective and objective methods **15 Hours**

Texture analyser- mechanical characteristics- chewiness, brittleness, and geometric characteristics, Sensory panel-types-criteria for panel selection

Unit V: Applications of Sensory Analysis in the Food Industry **15 Hours**

Quality control; storage stability testing; product development and consumer acceptance testing

References

1. Herbert Stone, Joel L. Sidel, (2012), "Sensory Evaluation Practices", Academic Press Publishers.
2. Maynard A. Amerine, Rose Marie Pangborn, Edward B. Roessler, (2013), "Principles of Sensory Evaluation of Food", Elsevier Publications.
3. Harry T. Lawless, Hildegarde Heymann, (2010), "Sensory Evaluation of Food: Principles and Practices", Springer Science & Business Media.

**VFP5S20P – Processing of Fruits and Vegetables (Practical)
(SKILL COURSE - 20)**

Semester V

Total Credits: 2

Total Laboratory Hours: 60 (3 Hours/ Week)

Aim of the course: To study the principles and methods of preservation of fruits and vegetables into various products and to practically gain skill in development of these products.

Syllabus Content

1. Handling and operating of food processing equipments and Instruments

- Pulper
- Sealers
- Juice extracting machines
- Autoclaves
- Corking machines
- Refractometer
- Salinometer
- Hydrometers
- Jelmeter
- Thermometer

- Vacuum gauge, pressure gauge, seam checking gauge
- Electronic weighing balance

2. Quality analysis

- Quality evaluation of fruits and vegetables.
- Quantitative analysis of cut fruits and vegetable yield.
- Effects of pretreatment on quality of cut fruits and vegetables.
- Refrigeration storage of fruits and vegetables
- Determination of Maturity indices of fruits & vegetables.

3. Quality Testing

- Determination of Degree Brix (TSS), pH and % acidity in fruits and vegetable products.
- Estimation of benzoic acid, sulphur dioxide and KMS in terms of ppm present in fruits and vegetable products.
- Estimation of reducing and non reducing sugars in fruit and vegetable products
- Estimation of chloride content in food products.

4. Preservation techniques

- Extraction of juice by different methods.
- Preservation of fruits juices with addition of preservative.
- Preparation of fruit and synthetic beverages.
- Preparation of carbonated beverages.

5. Product Preparation

- Preparation of tomato juices, puree, sauces, ketchups, soup, paste.
- Comparison of juice/pulp extraction methods on quality and yield of tomatopulp.
- Preparation of jam, jelly and marmalades.
- End point determination in preparation of high sugar product.
- Preparation of preserves, candies, crystallized and glazed fruits and fruitbars.
- Effects of pre- treatment and process variables on quality of preserve and candied fruits.
- Preparation of chutney
- Preparation of sauerkraut, gherkins, cauliflower, lime, mango and mixed pickles.

**VFP5G11T – Food Processing Equipments
(GENERAL COURSE - 11)
Semester V
Total Credits: 4
Total Lecture Hours: 60 (4 Hours/ Week)**

Aim of the course: To introduce basic equipment design and various control mechanisms.

Syllabus Content

Unit I: Introduction to equipments used in food industry **10 Hours**

Equipments: Types, planning, factors affecting selection and purchase

Unit II: Mechanical Equipments **16 Hours**

Transport equipments: Fluid food transport equipment, mechanical conveyors.
Storage equipments: Solid and liquid food storage equipments. Processing equipments: Size reduction, homogenization, mixing and foaming equipments.
Separation equipments: Grading and sorting equipments.

Unit III: Heat exchangers, dryers and evaporators **12 Hours**

Heat transfer equipments: Heat exchangers. Food evaporation equipments: food evaporators, evaporator components. Food dehydration equipments – Food dehydration principle, food dryers, hygiene and safety considerations.

Unit IV: Refrigeration and thermal processing equipments **12 Hours**

Refrigeration and freezing equipments: Refrigerants, freezers, chillers. Thermal processing equipments: sterilizers, pasteurizers, blanchers.

Unit V: Food packaging Equipments **10 Hours**

Introduction, preparation of food containers, filling equipments, closing equipments, group packaging.

Reference Books

1. Saravacos, George, (2015), “Handbook of Food Processing Equipment”, Springer Publishing.
2. H. L. M. Lelieveld, John Holah, David Napper, (2014), “Hygiene in Food Processing: Principles and Practice”, Elsevier Publications.
3. Sue Azam-Ali, (2003), “Small-scale Food Processing: A Directory of Equipment and Methods”, ITDG Publishing.

**VFP5G12T – Computer Applications
(GENERAL COURSE - 12)
Semester V
Total Credits: 4
Total Lecture Hours: 60 (4 Hours/ Week)**

Aim:

- To understand the operations of windows operating system, desktop, text editing and printouts in word pad
- To understand the operations of MS WORD-(Editing , Formatting, inserting)
- To understand the various operations in MS-Excel

Syllabus Content

Unit I: Office Automation 10 Hours

Introduction-Tools, Windows 8, desktop, files and folders, printers, Microsoft Office button, Quick access tool bar

Unit II: MS Word 7 15 Hours

Introduction- Typing text, Saving, opening, Closing, common edit functions (cut copy paste, change case). Text Editing - Inserting text, spell check, correcting mistakes,common formatting functions. Formatting paragraph, tables, bullets & numbering, inserting clipart & word art, picture & Drawing tool bar, Header & footer.

Unit III: MS Excel 15 Hours

Introduction- Parts of MS Excel windows, opening, saving and closing, workbook, entering data and numbers, Texts, date & time, formatting data, tool bar, drawing in MS Excel, Drawing tool bar, formatting & editing worksheet. Format cells, row , column, work sheet (Inserting, deleting, renaming) Formulas, functions, charts.

Unit IV: MS Power Point 10 Hours

Introduction- Parts of power point windows. Features, background design, word art, clipart, 3D settings. Animations, sound views, types of views, inserting, deleting ,arranging slides, slide shows

Unit V: DBMS, Internet & Email 10 Hours

DBMS Intro & basic concepts, Internet introduction, Creating Email- Inbox,compose, draft, attachments.

References

1. Study material for Diploma in Computer Application, Centre for continuing Education, Kerala.
2. Tom Bunzel, MS Office Research Guide; Information IT.com.

**VFP5G13T – Product and Brand Management
(GENERAL COURSE - 13)**

Semester V

Total Credits: 4

Total Lecture Hours: 60 (4 Hours/ Week)

Aim:

- To know about the various factors to be kept in mind while managing a newproduct
- To know about the various types marketing strategy involved in generating salesfor a new product food products’
- To have a basic idea about different marketing skills, the different ways in whicha food can be marketed to give optimum visibility.
- To understand the importance of packaging in improving sales and the latest marketing trends.

Syllabus Content**Unit I: Product management 13 Hours**

Introduction and importance- role of product manger product plan and itscomponents, product line-additions, alterations and its deletions.

Unit II: Product positioning 13 Hours

Kinds-organizing the product teams-product policy-new product demand forecasting models-product portfolio model-perceptual mapping.

Unit III: New product development 10 Hours

Stages-new product launch-strategies-mistakes success and failures.

Unit IV: Brand management 12 Hours

Strategic issues in brand management-concepts principles-brand extension-brand stretching-brand equity and its components- its measurement

Unit V: Co-branding 12 Hours

Brand positioning- product management audit-multi branding-Re-branding-packaging methods and strategies.

SEMESTER VI

Course code	Title of the course	Lec.	Lab.	Total Credits	Total Hours
VFP6S21T	Unit Operations in Food Industry	5	-	5	75
VFP6S22T	Food Quality Assurance	3	-	3	45
VFP6S23T	Project and Viva Voce	8	-	10	120
VFP6G14T	Emerging Technologies in food industry	4	-	4	60
VFP6G15T	Food servicemanagement	4	-	4	60
VFP6G16T	Marketing Managment	4	-	4	60

**VFP6S21T - Unit Operations in Food Industry
(SKILL COURSE - 21)
Semester VI**

Total Credits: 5
Total Lecture Hours: 75 (5 Hours/ Week)

Aim of the course: To provide in-depth knowledge in basic concepts of various unit operations in a food industry.

Unit I: Heat Transfer in Food Processing 10 Hours

Modes of heat transfer-conduction, convection and radiation- heat exchangers- plate heat exchanger-tubular heat-scraped surface heat exchanger.

Unit II: Evaporation 15 Hours

Basic principle, need for evaporation, single effect, multiple effect, heat economy, type of evaporator-long tube, short tube, agitated film evaporator.

Unit III: Distillation and crystallization 15 Hours

Simple distillation, flash distillation, steam distillation, fractional distillation
Crystallisation -theory, tank crystallizer and scraped surface crystallizer.

Unit IV: Extraction and extrusion 15 Hours

Solid Liquid extraction-leaching, Liquid-Liquid extraction, Super critical fluid extraction, single screw extruder, twin screw extruder

Unit V: Mechanical separation and material handling 15 Hours

Sedimentation, Centrifugal separation, filtration, Mixing, Material handling-Belt conveyor, Screw Conveyor, bucket elevator and pneumatic conveyor.

References

1. Y.H.Hui, (2005), "Handbook of Food Science, Technology and Engineering" (vol.1-4), Marcel Dekker Publishers.
2. M.A.Rao, S.S.H.Rizvi and A.K.Dutta, (2005), "Engineering properties of Foods", 3rd ed., Marcel Dekker Publishers.
3. H.Pandey, H.K. Sharma, R.C.Chouhan, B.C. Sarkar and M.C. Bera, (2004), "Experiments in Food Process Engineering", CBS Publishers and Distributors.
4. R.P.Singh and D.R.Heldman, (2001), "Introduction to Food Engineering", 3rd ed., Academic Press.
5. S.K.Sharma, S.J.Mulvaney and S.S.H.Rizvi, (2000), "Food Process Engineering: Theory and Laboratory Experiments", Wiley and Sons Publishers.

VFP6S22T - Food Quality Assurance
(SKILL COURSE - 22)
Semester VI
Total Credits: 3
Total Lecture Hours: 45 (3 Hours/ Week)

Aim of the course: To acquaint with food quality parameters and control systems, food standards, regulations, specifications.

Syllabus Content

Unit I: Concept of quality 6 hours

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

Unit II: Concepts of quality management 12 Hours

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 III: HACCP system 7 Hours

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

Unit IV: Food Quality Laws and Regulations 12 Hours

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.

Unit V: Intellectual Property Rights 8 Hours

IPR – Introduction, History in India, Laws related to IPR, Copyright, patent, trademark, designs, geographical indications of food, World Intellectual Property Organization (WIPO), Commercialization of Intellectual Property Rights (IPR), important websites.

Reference Books

1. Yong-Jin Cho, Sukwon Kang.(2011), “Emerging Technologies for Food Quality and Food Safety Evaluation” ,CRC Press.
2. Alli Inteaz, (2003), “Food Quality Assurance: Principles and Practices”, CRC Press.
3. Vasconcellos J. Andres, (2003), “Quality Assurance for the Food Industry: A Practical Approach”,CRC Press.

VFP6G14T - Emerging Technologies in Food Industry (GENERAL COURSE - 14)

Semester VI

Total Credits: 4

Total Lecture Hours: 60 (4 Hours/ Week)

Aim of the course: To understand about new developments in food industry and to impart knowledge about the importance and applications of the technology.

Syllabus Content

Unit I: Membrane separation process

10 Hours

Membrane Technology-process- Micro-filtration, Ultra-filtration, Nano-filtration and Reverse Osmosis-advantages-equipment

Unit II: High pressure processing and microwave heating **15 Hours**

Microwave heating of foods- Mechanism of Heat Generation-Working of microwaveoven,High Pressure processing: Concept-Equipment for HPP Treatment-Mechanismof Microbial Inactivation and its Application in Food , dielectric heating of foods

Unit III: Irradiation and PEF and ohmic heating **15 hours**

Pulsed electric field – equipment –mechanism of PEF-advantages, Ohmic heating of foods- mechanism- principle-advantages, applications. Irradiation- principle- types of irradiation-advantages-applications

Unit IV: Osmotic dehydration of foods and minimal processing **10 hours**

Principle – Mechanism of osmotic dehydration – Effect of process parameters on mass transfer – Methods to increase the rate of mass transfer – Applications
Limitations of osmotic dehydration – Management of osmotic solutions. Minimal processing-principle- methods- advantages

Unit V: Nanotechnology and antimicrobial technology **10 hours**

Role of Antimicrobial agents in food –Plant and animal derived antimicrobials – Antimicrobial enzymes, antimicrobial food packaging, nanotechnology-application of nanotechnology in food industry

Reference Books

1. Leistner L. and Gould G. Hurdle Technologies – Combination treatments for foodstability safety and quality, Kluwer Academics / Plenum Publishers, New York (2002)
2. Novel Food Processing Technologies(Food Science and Technology Series) by Gustavo V. Barbosa-Canovas, Maria S. Tapia, M. Soledad Tapia, M. Pilar Cano,Publisher: CRC Press, November 2004, ISBN-13: 9780824753337,
3. P Richardson (2001), “Thermal Technologies in Food Processing”, Campden andChorleywood Food Research Association, UK, Woodhead Publishing Limited.

**VFP6G15T – Food Service Management
(GENERAL COURSE - 15)**

Semester VI

Total Credits: 4

Total Lecture Hours: 60 (4 Hours/ Week)

Aim of the course: To understand the functioning of food service establishments and to acquire knowledge about the services that should be given by a food serviceestablishment.

Syllabus Content

Unit I: Introduction to Food Service Establishments **8 Hours**

Types of food service establishments. Planning for a food service unit- Planning, investment, Project report, Registration (License and Inspection).

Unit II: Menu Planning and table setting **14 Hours**

Menu Planning- importance, types, steps in planning. Requisites in designing a menu card, Methods of purchase, delivery, receiving, storage types. Table Setting and Arrangement - Indian and Western Styles of Table Setting, Table Appointments, Napkin folding styles, Flower arrangement, Table Etiquettes.

Unit III: Food Service and Delivery system **15 Hours**

Centralized and decentralized delivery systems, types of food service systems conventional, commissary, ready prepared, assembly, service styles - table, counter, tray, silver, plate, cafeteria, buffet. Specialized forms of food service - hospitals, airline, rail, homedelivery, catering and banquet, room and lounge service.

Unit IV: Food Service Management **15 Hours**

Managing an organization, Process involved, Principles of management, Functions of management- planning, organizing, directing, co-ordinating, evaluating, andcontrolling. Total quality management, Management by objectives. Work design, job design, work study and simplification.

Unit V: Accounting 8 Hours

Book keeping, books of accounts, Journal, Ledger, trial balance, balance sheet.profit analysis, food cost control.

Reference Books

1. Arora, (2007), "Food Service And Catering Management" APH Publishing.
2. Wentz Bill, (2007), "Food Service Management", Atlantic Publishing Company.
3. Malhotra, R. K.(2002), "Food Service and catering Management" ,Anmol Publication Pvt Ltd.

**VFP6G16T– Marketing Management
(GENERAL COURSE - 16)
Semester VI
Total Credits: 4
Total Lecture Hours: 60 (4 Hours/ Week)**

Aim:

- To know about the various types marketing strategy involved in generating salesfor a new product food products'
- To have a basic idea about different marketing skills,
- To know the different ways in which a food can be marketed to give optimumvisibility,

- To understand the importance of packaging in improving sales and the latest marketing trends

Syllabus Content

Unit I: Marketing management

10 Hours

Introduction- Definition of marketing and marketing management- Marketing concepts and functions-Marketing research – marketing mix.

Unit II: Market segmentation

12 Hours

Concept-Need- Basis-Market targeting-Market Positioning -Understanding consumer behaviour- Buying motives- Factors influencing consumer buying decisions

unit III: Marketing of products

18 Hours

Product- Meaning- Product development- Product mix- PLC- Branding- brand equity- Brand loyalty-Trade mark. Packaging and labelling - Pricing of products- Factors influencing pricing- Pricing policies and Strategies-Types of pricing.

Unit IV: Logistic and supply chain management

10 Hours

Its elements-Channel of distribution types- Factors affecting the choice of a channel of distribution.

Unit V: Emerging trends in marketing

10 Hours

Modern marketing- Direct marketing- E Marketing- Tele marketing-Viral marketing - Relationship marketing-Social marketing-Demarketing - Remarketing- Synchromarketing- Service marketing.