Revised Syllabus

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

Under National Skill Qualification Framework (NSFQ)

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

Submitted to

Savitribai Phule Pune University, Pune

By

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

Revised Syllabus Draft for First Year

B. Voc. (Food Processing Technology)

Semester - III

Subject Code	Name of the Subject	TH/PR	Credits	Contact Hrs.
FPT07	Post-Harvest Management of Fruits and Vegetables	TH	4	60
FPT08	Food Safety and Quality Control	TH	4	60
FPT09	Food Analysis	TH	4	60
FPP07	Practical on Post Harvest Management of Fruits and Vegetables	PR	6	90
FPP08	Practical on Food Safety and Quality Control	PR	6	90
FPP09	Practical on Food Analysis	PR	6	90
Total			**30**	**450**

List of Qualification Packs for Level 6

1. Food Microbiologist
2. Food Regulatory Affairs Manager

Program Outcomes

1. To provide judicious mix of skills relating to a profession and appropriate content of General Education.
2. To ensure that the students have adequate knowledge and skills, so that they are ready to work at each exit point of the programme.
3. To provide flexibility to the students by means of pre-defined entry and multiple exit points.
4. To integrate NSQF within the undergraduate level of higher education in order to enhance employability of the graduates and meet industry requirements. Such graduates apart from meeting the needs of local and national industry are also expected to be equipped to become part of the global workforce.
5. To provide vertical mobility to students coming out of 10+2 with vocational subjects

SECOND YEAR SEM III
THEORY PAPER 1

FPT 07: Post Harvest management of fruit and vegetables (3 credits)

Course Outcomes:

1. Students will understand about different preservation techniques and its role in food industry.
2. They will learn about processing of different fruits and preservation by preparation of different beverages, like RTS, squash, cordial, nectar, concentrate and fruit powder
3. They will learn processing of jam, jelly, marmalade and defects in preparation of products.
4. They will get knowledge about drying and dehydration of fruit and vegetable.
5. They will learn processing of tomato and different tomato products.

Sr. No.	Topic	Lectures (60L)
1.	**Introduction** 1. Importance of fruits and vegetables 2. Classification of fruits and vegetables 3. History and need of preservation, Reasons of spoilage 4. Current status of production and processing of fruits and vegetables. Structural, compositional and nutritional aspects. 5. Post-harvest physiology, handling, losses and conservation of fruits and vegetables 6. Methods of preservation (short and long term)	12
2.	**Canning and bottling of fruits and vegetables** 1. Selection of fruits and vegetables 2. Process of canning 3. Factors affecting the process: time and temperature 4. Containers for packing 5. Lacquering 6. Syrups and brines for canning 7. Spoilage of canned foods	8
3.	**Fruit beverages** 1. Introduction 2. Processing of fruit juices (selection, juice extraction, deaeration, straining, filtration, clarification and bottling 3. Preservation of fruit juices (pasteurisation, chemical preservation with sugars, freezing, drying, tetra packing, carbonation) 4. Processing of RTS, cordials, nectars, squashes, concentrates and powders.	10
4.	**Jams, Jellies and marmalades** 1. Jams: constituents, selection of fruits, processing technology, defects	10

	2. Jelly : essentials of constituents (role of pectin and ratio), theory of jelly formation, processing and technology, defects 3. Marmalades: types, processing technology, defects	
5.	**Pickles, chutney and sauces**	7
	1. Types 2. processing technology causes of spoilage	
6.	**Tomato products**	6
	1. Introduction 2. Selection of tomatoes 3. pulping and processing of different tomato products- tomato puree, sauces, ketchup, soup and paste	
7.	**Dehydration of foods and vegetables**	7
	1. Sun drying and mechanical dehydration factors affecting drying operations, Industrial drying operations. 2. Spray drying. Drum drying, vacuum, fluidized beds and freeze drying. 3. Quality and stability of dried foods, Rehydration properties. Sensory and nutritive aspects 4. process variation of fruits and vegetables packing and storage	

References:

1. Food science by B.Srilakshami;New Age International.
2. Fundamentals of Foods and Nutrition by R. Madambi& M.V. Rajgopal.
3. Foods :Facts and Principles by N Shakuntalamanay;New Age International (P) Ltd.
4. Preservation of Fruits and Vegetable by Girdharilal and Sidappa; CBS Publications
5. Food Science and Processing Technology,Vol., 2 by Mridula and Sreelata
6. Food Preservation by Sandeep Sareen
7. Fruit and Vegetable Preservation by Shrivastava and Kunal.
8. Post-Harvest Physiology & Handling of Fruits & Vegetables by Wills, Lee, Graham, Mc Glasson& Hall (AVI)
9. Literature from Spice Board of India, etc.
10. Girdharilal, Siddappaa, G.S and Tandon, G.L., Preservation of fruits &Vegetables, ICAR, New Delhi, 1998
11. W B Crusess. Commercial Unit and Vegetable Products, W.V. Special IndianEdition, Pub: Agrobios India
12. Manay, S. &Shadaksharaswami, M., Foods: Facts and Principles, New AgePublishers, 2004

SECOND YEAR SEM III
THEORY PAPER 2

FPT 08: Food Safety and Quality Control

Course Outcome:

1. Students will learn which microorganisms cause spoilage, assessment of food based on microbial quality, microbial assessment of foods.
2. They will learn which microorganisms cause spoilage, assessment of food based on microbial quality, microbial assessment of foods.
3. Students will understand the basic of food safety, implementation of HACCP, importance of TQM in food industry, different ISO series and their uses, importance of auditing and accreditation in food industry.

Chapter No	Content	Lectures (60L)
1.	**Introduction to Food Safety :** Definition**,** Types of hazards, Factors affecting Food Safety**,** Importance of Safe Foods	**15**
	Food Hazards of Physical and Chemical Origin • Introduction • Physical Hazards with common examples • Chemical Hazards (naturally occurring ,environmental and intentionally added) • Impact on health and Control measures	
2.	**Food Hazards of Biological Origin** • Introduction • Indicator Organisms • Food borne pathogens: bacteria, viruses, eukaryotes, Seafood and Shell fish poisoning, Mycotoxins	**15**
3.	**Management of hazards:** Control of parameters**,** Temperature control**,** Food storage, Sources of food contamination, Pest Control, Personal hygiene , Control methods using physical and chemical agents, Waste Disposal	**12**
4.	**Microbiological criteria** • MRA • Microbiological Assessment and categories of food based on microbial Quality • Sampling • Basic steps in detection of food borne pathogens • Water Analysis	**08**
5.	**Laws:** GMP/GHP; GLP, GAP HACCP ISO FSSA TQM certification and quality assurance (PFA, FPO, MPO, AGMARK, BIS) Codex	**10**

References:

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

SECOND YEAR SEM III
THEORY PAPER 3
FPT 09: Food Analysis

Course Outcome:

1. They will learn different physical, chemical and rheological properties of foods.
2. Students will understand the techniques of food analysis viz. gravimetric colorimetric, chromatographic with their working principles and application.
3. They will acquire knowledge about sensory attributes, facilities for sensory evaluation sensory evaluation methods of food.
4. They will learn about sampling procedure and types of sampling, its uses for sensory evaluation,
5. They will learn about proximate analysis of foods and different instruments application.

Chapter No	Content	Lectures (60L)
1.	Introduction to Food Analysis- Food composition and Factors affecting food composition. Physical properties: Colour, viscosity, size and shape: & Chemical properties of foods. rheological properties of food Sampling techniques; Sample collection and preparation for analysis, Evaluation of GRAS aspect of food additives;	**15**
2.	**p**H meter : Theory, Principle, types and application Moisture Meter: Theory, Principle, types and application Centrifuge : Theory, Principle, types and application Methods of analysis: Proximate constituents: Total fat, crude fiber, protein, moisture, minerals analysis; adulterations	**15**
3.	Spectroscopic analysis- Principle, instrumentation & application Colorimetric (colorimeter), Titrimetric analysis : Principle, types and application Gravimetric analysis : Principle, types and application Chromatographic techniques : Principle, types and application	**12**
4.	Sensory attributes of foods: mechanisms of sensation and perception of colour, taste, odour, and flavour; importance and use of sensory evaluation, methods of sensory evaluation, facilities required for sensory evaluation. Shelf life study of foods.	**10**
5.	Analysis of sensory data; Statistical testing; correlating instrumental and sensory measurements. Nutritional labelling of foods.	**08**

References:

1. A. V. Sathe, A First Course in Food Analysis, New Age International Pvt. Ltd. 1999
2. S. S. Nielsen, Food Analysis, 3rd ed., Kluwer Academic Publishers, 2003
3. S. S. Nielsen, Food Analysis Laboratory Manual, Kluwer Academic Publishers, 2003
4. R.Wood, L.Foster, A.Damant and P.Key, Analytical Methods for Food Additives, Wood head Publishing, 2004
5. Y. Pomeranz and C.E.Meloan, Food Analysis: Theory and Practice, 3rd ed., Chapman & Hall, 1994
6. AOAC, Official Methods of Analysis and AOAC International, 2005
7. R.E.Wrolstad, T.E. Acree, E.A.Decker, M.H.Penner and D.S.Reid, Handbook of Food Analytical Chemistry, John Wiley & Sons, 2004

SECOND YEAR SEM III
PRACTICAL PAPER 1

FPP 07: Practical on Post-Harvest management of fruit and vegetables

Course Outcomes:

1. They will understand the preservation of fruits and vegetable by pickling.
2. They will learn to preserve the fruit by sugar by preparing squash.
3. Students will understand the drying of fruit and vegetables
4. They will understand processing of different fruit and vegetable products like jam, jelly, squash, mango bar, tomato ketchup.
5. They will acquire knowledge about sensory evaluation, sensory evaluation of processed product.
6. They will learn to control the enzymatic browning in fruit and vegetables by using different method like blanching, salt solution, acid solution, normal water solution, refrigeration

S.No.	Post - Harvest management of fruit and vegetables (6 credits)	Practical (30P)
1.	Determination of moisture content of fruit and vegetable	2 P
2.	Quality parameter evaluation of fresh fruit and vegetable.	2 P
3.	Controlling enzymatic browning in fruit and vegetable	3 P
4.	Asses the adequacy of blanching.	1 P
5.	Pre-treatment and drying of fruit and vegetable	2 P
6.	Experiment on dried product quality evaluation.	1 P
7.	Preparation of mixed fruit jam	2 P
8.	Preparation of jellies	2 P
9.	Preparation of RTS, squash	3 P
10.	Preparation of sauce and ketchup	2 P
11.	Carry out the preservation of fruits and vegetables by pickling	3 P
12.	Sensory evaluation of processed products.	2 P
13.	Osmotic dehydration of fruits and vegetables.	2 P
14.	Bottling of peas.	1 P
15.	Examination of canned pineapple.	1 P
16.	Identification of different types of packaging material used in the food industry.	1 P

SECOND YEAR SEM III
PRACTICAL PAPER2

FPP 09: Practical on Food Safety and Quality Control

Course Outcomes:

1. Students will understand to prepare different types of media with its importance.
2. They will learn different methods for microbial examination in food sample and detection methods.
3. They will acquire knowledge about water analysis, personal hygiene, surface analysis and methods used in it.
4. They will learn how to calculate aerial microbial count and its importance, various biochemical tests used for pathogens.
5. They will learn implementation of HACCP and ISO.

Sr. No.	Practical on Food Safety and Quality Control (6 Credits)	Practical (30P)
1	Preparation of different types of media (complex, differential and selective)	2P
2	Enumeration of aerial micro flora using PDA	2P
3	Microbiological Examination of different food samples	2P
4	Bacteriological Analysis of Water	2P
5	Assessment of surface sanitation by swab/rinse method	2P
6	Assessment of personal hygiene	2P
7	Biochemical tests for identification of bacteria	2P
8	Scheme for the detection of food borne pathogens	2P
9	Implementation of FSMS – HACCP, ISO : 22000	2P
10	Qualitative tests for fats and oils, spices and condiments	2P
11	Inspection of quality as per National and International standards for various food stuffs- pulses, spices, etc.	2P
12	Analysis of edible common salt for MC, MIW and total chlorides.	2P
13	Detection of adulteration in various foods	2P
14	Study of National and Codex microbial quality standards	2P
15	Activities of Quality Department and Studies on bar codes	2P

SECOND YEAR SEM III
PRACTICAL PAPER 3
FPP 09: Practical on Food Analysis

S.No	Practical on Food Analysis (6 Credits)	Practical (30P)
1.	Basic Instruments/ Equipments used in biochemical laboratories and important working	1
2.	Preparation of Solutions : Normality, Molarity, Percent solutions, Buffers	1
3.	Physical examination of various food grains	1
4.	Quality analysis of milk	1
5.	Experiments on fat tests.	1
6.	Determination of gluten content and water absorption capacity	2
7.	Quality analysis of water	1
8.	Separation and identification of amino acids by paper chromatography	2
9.	Separation and identification of molecules by Thin Layer Chromatography	1
10.	Determination of total ash content in food products. Preparation of ash solution for mineral estimation.	2
11.	Determination of Titratable acidity and pH of fruit juice	2
12.	Sensory analysis of food products	2
13.	Determination of impurities of oil samples	2
14.	Free fatty acids in fats and oils	2
15.	Qualitative analysis of Carbohydrates and Amino acids	2
16.	Determination of protein in foods	2
17.	Determination of Reducing Sugars	2
18.	Estimation of fat by Soxhlet extraction method.	1
19.	Qualitative detection of adulterants in Atta, Maida, Besan, Biscuit, Black pepper, Butter, Ghee, Chilli Powder, Honey, Tea, Turmeric powder, soft drink	2

Semester - IV

Subject Code	Name of the Subject	TH/PR	Credits	Contact Hrs.
FPT10	Processing of Spices and Flavoring Agents	TH	4	60
FPT11	Food Packaging	TH	4	60
FPT12	Computer applications in Food Industry	TH	4	60
FPP10	Practical on Processing of Spices and Flavoring Agents	PR	6	90
FPP11	Practical on Food Packaging	PR	6	90
FPP12	Practical on Computer applications in Food Industry	PR	6	90
Total			**30**	**450**

SECOND YEAR SEM IV
THEORY PAPER 1

FPT 10: Processing of Spices and Flavoring Agents

Course Outcomes:

1. Students will understand the basic concepts, Production and processing scenario of spices, flavour & plantation crops and its scope in India.
2. They will understand the Major and Minor spices, herbs and leafy vegetables: processing and utilization.
3. They will understand about Spice oils, packaging of spices and processing of spice products, Separation, purification and identification of natural flavoring.
4. They will know Standards specification of spices and flavors.

Chapter No.	Topics	Lectures (60L)
1	Production and processing scenario of spices, flavour & plantation crops and its scope	4
2	Major Spices: (1) Post Harvest Technology composition, processed products of following spices (2) Ginger (3) Chilly (4) Turmeric (5) Onion and garlic (6) Pepper (7) Cardamom (8) Cashew nut	12
3	Minor spices, herbs and leafy vegetables: processing and utilization, All spice, Annie seed, sweet Basil, Caraway seed, Cassia, Cinnamon, Clove, Coriander, cumin, Dill seed Fern seed nutmeg mint marjoram, Rose merry, saffron, sage, thyme, Ajowan, Curry leaves, Asafoetida	10
4	Spice oils and oleoresins packaging of spices and spice products, Functional packaging of spices and spice products By-products of plantation crops and spices	8
5	Overview on flavouring compounds used in Food, Synthetic flavouring agents and their stability (Wines, spirits, MSG and vinegars)	8
6	Flavour Flavours of minor spices; Flavour of major spices , Flavours of soft drinks, Baking and confectionery industry Natural flavouring agents and their stability(Vanilla, Cocoa beans, Olive oil, mustard oil and walnut oil)	10
7	Separation, purification and identification of natural flavouring Marinades and types of marinades(cooked and raw)	8

Reference:

1. Spices and Plantation Crops K.G. Shanmugavelu Agrotech Publication, Delhi
2. Spice and Condiments Pruthi J.S. National Book Trus, 1996

SECOND YEAR SEM IV
THEORY PAPER 2

FPT 11: Food Packaging Technology

Course Outcome:

1. Students will understand basic concepts of food packaging, shelf life and evaluation of packaging.
2. They will learn about methods of packaging and types of packaging materials.
3. They will understand about legal and management aspects of packaging.
4. Evaluation of quality and safety of packaging materials and different testing procedures

Sr No.	Topics	Lectures (60L)
1	**Introduction To Packaging** Introduction- evaluation of packaging- economics- packaging operations- packaging terminology. Need of packaging, Hazards in distribution- functions of package- design of packages for various foods.	7
2	**Packaging materials:** Classification of packages, Paper (corrugated and paper board boxes etc.), Glass, Metal, Aluminium and as package material its manufacture, types, advantages, disadvantages, plastic as package material, classification of polymers, properties, uses and chemistry of each plastic such as polyethylene, polypropylene, polystyrene, polycarbonate, PVC, PVDC, cellulose acetate, nylon. Lamination, need of lamination, types, properties, advantages & disadvantages.	17
3	**Special packaging methods-** MAP, CAP, Vacuum and gas packaging, shrink package, retort pouches- Bio degradable packages. Permeability – theoretical consideration permeability of gases and vapours, permeability of multilayer packages, permeability in relation to products.	10
4	**Canning Operations** Canning of food products- types of cans- open top sanitary cans- tin plate grades- lacquering and sealing compounds for OTS cans- canning operations- can washing and sterilization- exhausting- seaming- reforming and flanging operations- retorting of cans.	08
5	**Selection Of Packaging Materials** Special problems of packaging food stuffs- packaging of various foods- compatibility- toxicity- packaging equipments- packaging standards and regulations.	08
6	**Legal And Management Aspects Of Packaging**	10

	Laws and policies behind packaging, safety and legislative aspects of packaging. Testing and evaluation of packaging media- retail packs (including shelf life evaluation)and transport packages, Food marketing and role of packaging, packaging Aesthetic and graphic design, labelling in packages, coding and marking including bar coding.	

REFERENCE BOOKS

1. Sachrow & Griffin, "Food packaging"
2. Heiss R., "Principles of food packaging"
3. Paine E.A, "Fundamentals of packaging".
4. Day P.T., "Packaging of food beverages"
5. Brody AL, "Flexible packaging of Foods"
6. Gordon L. Robertson Food Packaging principles & practice, New york, Marcell DekkerInc.
7. Ronald H. Schmidt Gary E. Roderick Handbook of Food packaging, Food safety Technology by NIIR Board of consultants & Engineers
8. Bureau of G and Multon J.K Food Packaging technology, (Vol.1 and 2) – VCH publishers, INC, New York.
9. Kadoya, T. (1994), Food Packaging, Academic Press, New York

SECOND YEAR SEM IV
THEORY PAPER 2

FPT 11: Computer Applications in Food Industry

Course Outcome:

1. Students will understand a brief history of computing, data processing and information, anatomy of computers, input and output devices and various types of memories.
2. They will learn about personal computers, types of processors, booting of computer, warm and cold booting, computer viruses, worms and vaccines.
3. They will learn about Windows, MS Power Point and MS Word.
4. They will learn E-Commerce.

Sr.No	Topic	Lectures
1	**Computer Fundamental** • Introduction to Computer system • Anatomy of Computer • A Brief History of Computer • Computer Memory and its Unit • Various types of Computer Memory • Classification of Computer • Computer hardware used in food industry (Monitor screen, Touch Screens, Palm Tops, various Printers, Barcode Printers and Scanners, RFID Tags, etc.) • Software and Types of Software for their application in food industry (Like SAP, justFoodERP, FoodWorks, SERVE, etc.)	**8**
2	**Data Processing and Concept of Operating System** • **Introduction of Data Processing** • Data Processing Lifecycle • Difference between Data and Information • **Introduction to Operating System** • Functions of Operating System • Types of Operating System • Processor, Types of Processor, and its application • Basic Input output System (BIOS) and type of Booting • Typical DOS Internal and External Commands	8
3	**Window Operating System** Introduction of Window Operating System • Introduction of Graphical User Interface • Anatomy of Windows • Desktop and its Elements • Introduction of File Explorer • Organizing folders and files, multitasking, recycle bin, my computer. • Control Panel and its elements.	8
4	**MS-Office Package**	14

	• Introduction of MS-Office • Introduction of Spread Sheet Software • Introduction of MS-Power Point • Introduction of MS-Access	
5	• **Introduction of Problem-Solving Techniques** • Steps for Problem Solving • **Introduction of Algorithm** • Characteristics of Algorithm • Types of Order used in Algorithm with Examples (Minimum 3 Examples to each Order) • Advantages and disadvantages of Algorithm • **Introduction of Flowchart** • List of Notation used in flowchart • Types of Order used in Flowchart with Examples (Minimum 3 Examples to each Order) • Advantages and disadvantages of Flowchart • Basic Introduction of Programming Languages Like (C, HTML, JAVA, PHP, Python, R-Software, MATLAB etc.)	12
6	**Computer Networking and Communications, E Commerce** • Computer Networks Goals and applications like Business Application, Home Application, and Mobile User. • Computer Transmission Medium (Guided and Unguided) • Network Types LAN, MAN, WAN, Wireless Networks, Home Networks, Internetwork. • Network Hardware (Router, Switches, Hub) • Network Topology (Star, Ring, Bus, Mesh, Tree, Hybrid, etc.) • Concept of Intranet, Extranet, and Internet • Network Protocols like (TCP/IP, IP, FTP, PPP, HTTP and HTTPS) • Network Security and firewall • Introduction to World Wide Web (WWW) • Introduction of E-Commerce • Types of E-Commerce • Features of E-Commerce • Use of E-Commerce in Food Industry	10

Book References:

1. Computer Fundamental by P.K. Sinha & Priti Shinha
2. Computer Fundamental by Anita Goel
3. Computer Networks (Fourth Edition) by Andrew S. Tanenbaum
4. Problem Solving with C by Somashekara, M. T. Guru D. S.

SECOND YEAR SEM IV
PRACTICAL PAPER 1

FPP 10: Practical on Processing of Spices and Flavoring Agents

Course Outcomes:

1. They will understand the Identification and characterization of flavouring compounds of spices
2. They will acquire the knowledge about Packaging study of spices
3. They will understand preparation of curry powder and preparation of Indian Masala for different foods
4. Students will understand preparation of flavoured oils and Preparation of various marinades.

S. No.	TOPICS	Practicals (30 P)
1	A. Identification and characterization of flavouring compounds of spices B. Nomenclature of spices	**2** **2**
2	Study of different grinding methods of spices	**2**
3	Preparation of Rajasthani curry powder	**1**
4	Preparation of Asian curry powder and south Indian curry powder	**2**
5	Preparation of flavoured oils(Garlic oil, Green chilli oil and Basil oil)	**2**
6	Preparation of Indian (Garam) Masala for different foods	**2**
7	Preparation of chat masala	**1**
8	Preparation of Tea masala	**1**
9	Preparation of Pavbhaji masala	**1**
10	Study on Curing of ginger	**2**
11	Detection of adulteration in spices	**2**
12	Steam distillation of spices for essential oil	**2**
13	Preparation of various marinades Chicken marinades Paneer marinades	**2**
14	Study of standard specification of spices, ESA, ASTA, FSSAI	**2**
15	Study of Spices Board of India, Study of spices research institutes in India	**2**
16	Packaging study of spices	**2**

SECOND YEAR SEM IV
PRACTICAL PAPER 2

FPP 10: Practical on Food Packaging Technology

Course Outcomes:

1. Students will understand about Identification of different types of packaging and packaging materials and measurement of thickness of packaging materials.
2. They will learn about performing destructive and non-destructive test on glass container.
3. They will study determination of shelf life of packaged foods and determination of ERH of foods.
4. They will learn about recent trends in food packaging.

Sr. No.	Topic	Practical (30P)
1.	Identification of different types of packaging and packaging materials	**2**
2.	Determination of tensile strength of given material	**2**
3.	Performing destructive and non-destructive test on glass container: determination of wax weights,	**2**
4.	Determination of bursting strength	**2**
5.	Determination of WVTR of packaging materials	**1**
6.	Measurement of thickness of packaging materials;	**2**
7.	Testing of chemical resistance of packaging materials	**1**
8.	Determination of shelf life of packaged foods; determination of ERH of foods	**2**
9.	Determination of drop test of food packages	**2**
10.	Determination of Box compression test;	**2**
11.	Determination of coding on package materials	**2**
12.	Pre-packaging practices followed for packing of fruits and vegetables	**2**
13.	Study on nutritional labelling of different food materials.	**2**
14.	Study of vacuum packaging machine, bottle filling machine and form-fill-seal machine	**2**
15.	Shelf life calculations for food products in different packaging materials	**2**
16.	Introduction to students with the latest trends in packaging consulting the websites and magazines	**2**

SECOND YEAR SEM IV
PRACTICAL PAPER 3

FPP 11: Practical on Computer Applications

Course Outcomes:

1. Students will understand study of computer components; booting of computer and its shut down.
2. They will Practice of some fundamental DOS Commands.
3. They will study MS-Word, MS-Access, MSEXCEL and MS Power Point
4. They will study different Programming Language
5. Students will get introduced to f Computer Networking Tools and E-Commerce platform used in Food Industry

S. No.	TOPICS	Practicals (30 P)
1	Study of Computer Components	2
2	Study of Hardware and Software Components used in Food Industry	2
3	Study of Operating System	2
4	Practice of some fundamental DOS Commands	2
5	Practice of Basic MS-Word Operation as Word Processing Software	2
6	Practice of Advanced MS-word Operation as Word Processing Software	2
7	Practice of Basic MS-Excel function as Statistical tool	2
8	Practice of Advanced MS-Excel function as Statistical tool	2
9	Practice of Basic MS-PowerPoint Operation	2
10	Practice of Advanced MS-PowerPoint Operation	2
11	Practice of Basic MS-Access functions	2
12	Practice of some Basic and Advance Algorithm using MS-Word	2
13	Practice of some Basic and Advance Flowchart using MS-Word	2
14	Introduction of Different Programming Language	2
15	Introduction of Computer Networking Tools and E-Commerce platform used in Food Industry	2