SHIVAJI UNIVERSITY, KOLHAPUR.

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CHOICE BASED CREDIT SYSTEM

Syllabus For

B.Sc. Part - II

Food Technology and Managemnt (Entire)

SEMESTER III AND IV

(Syllabus to be implemented from June, 2020 onwards)

B.Sc. Part - II

Food Technology and Management (Entire)

SEMESTER III AND IV

(Syllabus to be implemented from June, 2020 onwards)

Structure of B. Sc. Food Technologyand Management (Entire) Programme
Semester III & IV

Structure - II

Sr. No.	Course (Subject) Title	TEACHING SCHEME						EXAMINATION SCHEME						
		THEORY			PRACTICAL			THEORY				PRACTICAL		
		Credits	No. of lectures	Hours	Credits	No. of lectures	Hours	Hours	Max	Total Marks	Min	Hours	Max	Min
S E M E S T E R – III (Duration – 6 Months)														
1	DSC-FTM-C1	**2**	3	2.4	4	8	6.4	2	50	**100**	**35**	**PRACTICAL EXAMINATION IS ANNUAL**		
2	DSC-FTM-C2	**2**	3	2.4				2	50					
3	DSC-FTM-C3	**2**	3	2.4	4	8	6.4	2	50	**100**	**35**			
4	DSC-FTM-C4	**2**	3	2.4				2	50					
5	DSC-FTM-C5	**2**	3	2.4	4	8	6.4	2	50	**100**	**35**			
6	DSC-FTM-C6	**2**	3	2.4				2	50					
7	AECC-C	**4**	4	3.2	---	---	---			---	---			
	TOTAL	**16**	**22**	**17.6**	**12**	**24**	**19.2**			**300**	---			
S E M E S T E R – IV (Duration – 6 Months)														
1	DSC-FTM-D1	**2**	3	2.4	4	8	6.4	2	50	**100**	**35**	**As per BOS Guide-lines**	**100**	**35**
2	DSC-FTM-D2	**2**	3	2.4				2	50					
3	DSC-FTM-D3	**2**	3	2.4	4	8	6.4	2	50	**100**	**35**		**100**	**35**
4	DSC-FTM-D4	**2**	3	2.4				2	50					
5	DSC-FTM-D5	**2**	3	2.4	4	8	6.4	2	50	**100**	**35**		**100**	**35**
6	DSC-FTM-D6	**2**	3	2.4				2	50					
7	AECC- C AECC- D	---	---	---	---	---	---	3	70 30	**100**	**25** **10**	---	---	---
	TOTAL	**12**	**18**	**14.4**	**12**	**24**	**19.2**			**400**	---			
		28	**40**	**32**	**24**	**48**	**38.4**			**700**	--	---	**300**	

- Student contact hours per week : 32 Hours (Min.)
- Theory and Practical Lectures : 48 Minutes Each
- Total Marks for B.Sc.-II (Including EVS) **1000**
- Total Credits for B.Sc.-II (Semester III & IV) : **52**
- **DSC : -** Discipline Specific Core Course : All papers are compulsory.
- **AECC**- Ability Enhancement Compulsory Course (C) :
  Environmental Studies: EVS (Theory – 70 & Project – 30 Marks)
- Practical Examination will be conducted annually for100 Marks per course (subject).
- ***There shall be separate passing for theory and practical courses also for Environmental Studies.***

CBCS B. Sc.: Food Technology and Management (Entire):
List of courses:

B.Sc. FTM Part 2 (Semester III & IV)

Course code	Name of Course	Course code	Name of Course
Sem III		**Sem IV**	
DSC FTM-C1	Grain Science and Technology - I	**DSC FTM-D1**	Processing and Preservation of Fruits and Vegetables-I
DSC FTM-C2	Grain Science and Technology - II	**DSC FTM-D2**	Processing and Preservation of Fruits and Vegetables-II
DSC FTM-C3	Post Harvest Technology –I	**DSC FTM-D3**	Food Biochemistry-I
DSC FTM-C4	Post Harvest Technology –II	**DSC FTM-D4**	Food Biochemistry-II
DSC FTM-C5	Industrial and Agri Business Management- I	**DSC FTM-D5**	Food Packaging -I
DSC FTM-C6	Industrial and Agri Business Management- II	**DSC FTM-D6**	Food Packaging -II
AECC – C	Environmental Studies (Theory)	**AECC – D**	Environmental Studies (Project)

AECC-C: - Ability Enhancement Compulsory Course: Environmental Studies

Practical

DSC FTM-P5	Lab Course V (Based on DSC FTM-C1 & DSC FTM-C2, DSC FTM-D5 & DSC FTM-D6)	**DSC FTM-P7**	Lab Course VII (Based on DSC FTM-D3 & DSC FTM-D4)
DSC FTM-P6	Lab Course VI (Based on DSC FTM-D1 & DSC FTM-D2, DSC FTM-C3 & DSC FTM-C4)		

Semester III
Grain Science and Technology – Paper I
DSC FTM –C1-Grain Science and Technology - I
Credits2 (Marks 50) Hours 30,37.5 lectures of 48 Minutes

Unit – I	Hours Allotted
Milling of Cereals • Basic milling operations • Rice milling • Wheat milling • Corn milling • Sorghum milling • End products of cereals **Processing of cereals** • Parboiling of paddy • Rice based products- Rice flour, Parched rice, Parched paddy, Flaked rice, Rice starch, Saki • Byproducts of Rice- Rice bran, Rice bran oil, Rice polishings, Husk • Wheat flour and Wheat based products- Wheat flakes • Corn based products- Corn flakes, Pop corn • Barley physico-chemical properties • Barley and Sorghum malting • Sorghumphysico-chemical properties • Sorghum pearling • Industrial utilization • Processing of millets- oats/rye for food uses • Ready-to-eat-cereals- Flaked cereals, Puffed cereals, Shredded products, Granular products	**15**
Unit –II	
Milling of Pulses • Dhal milling – Dry and Wet milling of Tur dal,Green gram,Black gram and other pulses • Modern CFTRI method of dhal milling • Toxic constituents of pulses **Processing of legumes and pulses** • Soaking, Roasting, steaming and cooking • Germination, Parching • Factors affecting cooking of legumes • Processing of fried pulses • End products of legumes and pulses • Processed soyabean products- Soya oil, Meal,Flour, Infant formula • Pulse Protein Concentrates- Extracted soyabean proteins- Soyabean curd, Soyabean milk	**15**

• Fermented Products of Soyabean – Soy sauce, Soyabean paste (miso),Tempe, Natto, Hamanatto • Utilization of pulses - Mature seeds - Fresh seeds - Immature pods • Processed soybean products - Extracted soybean Proteins - Fermented products of soybean -	

References:

1. Postharvest Technology of Cereals, Pulses and Oilseeds- Chakravarti A.
2. Technology of cereals- Kent, N.L.
3. Legumes: Chemistry and Technology and Human Nutrition- Kent, N.L.
4. Wheat: Chemistry and Technology- Pomeranz
5. Modern Cereal Science and Technology-Pomeranz,
6. Handbook of World Food Legume: Chemistry- Salunkhe, D.K., Kadam
7. Quality of Wheat and Wheat Production- Salunkhe, D.K., Kadam and Austin
8. Foods: Facts and Principles- Dr. (Mrs) N. ShakuntalaManay
9. Food Science- B Srilakshmi

Semester IV
Grain Science and Technology – Paper II
DSC FTM –C2- Grain Science and Technology - II
Credits 2 (Marks 50) Hours 30, 37.5 lectures of 48 Minutes

Unit – I	Hours Allotted
Introduction to Nuts and Oilseeds • Importance of oilseed processing in India • Nuts as foods • Commercial edible oil sources • Important nuts and oilseeds • Functions of oils • Processing of nuts • Nutritional food mixes from oilseeds • Protein rich foods • Protein enriched cereal foods **Oil extraction and refining** • Extraction methods-Rendering, Pressing & Solvent Extraction • Refining of crude oil - Water refining - Alkali refining - Acid refining - Steam refining - Bleaching - Deodorization	15
Unit II	
Processing of oils and fats • Hydrogenation • Winterization • Soyabean technology – SPC, ISP, TSP • Method of preparation • Shortening types **Antinutritional factors in Cereal, legume and oilseed** • Saponins • Haemaglutinin • Trypsin inhibitors • Goitrogens • Saponins • Other antinutritional factors- phytates, tannins, oxalates, aflatoxins • Methods of their removal	**15**

References:

1. Fats and Oils: Chemistry and Technology Applied- Hamilton R.J. and BhartiA..
2. World Oilseeds:Chemistry, Technology and Utilization.-Salunkhe O.K., Chavan J.K., Adsule R.N. and Kadam
3. Modern Cereal Science and Technology- Pomeranz
4. Handbook of World Food Legume: Chemistry,Processing and Utilization- Salunkhe, D.K., Kada

Semester III
Post Harvest Technology- Paper I
DSC FTM- C3- Post Harvest Technology I
Credits 2 (Marks 50) Hours 30, 37.5 Lectures of 48 minutes

Unit-I	Hours Allotted
Plantation crops • Introduction to post harvest technology • Importance of plantation crops **Tea** • Occurrence • Chemistry • Harvesting • Types • Chemistry • Manufacturing of Green and Black tea, • Quality assessment and grading of tea • Instant tea **Coffee** • Occurrence • Chemistry • Harvesting • Fermentation and changes during fermentation • Drying • Roasting • Manufacturing process • Quality assessment and Grading of tea • Instant coffee .	**15**
Unit – II	
Cocoa • Introduction • Cocoa beans processing • Roasting and fermentation • Production of cocoa butter & powder **Chocolate** • Introduction • Ingredients • Types	

• Chocolate processing • Mixing • Refining • Conching • Tempering • Moulding • Cooling & Coating • Defects in chocolate **Raw and Refined Sugar** • Introduction • Manufacturing of Raw & Refined sugar **Post harvest technology of Fruits & Vegetables** • Introduction • Post harvest losses • Principle and method involved • Postharvest loss reduction techniques • Value addition	**15**

References

1. Post Harvest Technology of Fruits & Vegetables – L. R. Verma & V. K. Joshi
2. Food Technology Processing and Quality control - Aylwaed F.
3. Outlines of food Technology - Harry W.
4. Chocolate, cocoa and confectionery science and technology - Minife B.W.
5. Sugar Confectionery & Chocolate Manufacture – R. Less & E. B. Jackson
6. Industrial Chocolate Manufacture – S. T. beckett
7. Food Science - by Potter
8. Food Facts and Principles By Shakuntala Manay

Semester III
Post Harvest Technology- Paper II
DSC FTM- C4- Post Harvest Technology II
Credits 2 (Marks 50) Hours 30, 37.5 Lectures of 48 minutes

Unit – I	Hours Allotted
Post Harvest Technology of Spices • Introduction • Importance • Classification of Spices **Major Spices** • Black, White & Green Pepper • Cardamom • Chilies • Ginger • Cloves • Turmeric • Their post harvest technology • Chemical composition • Processed products • Oleoresins & Volatile oils	**15**
Unit – II	
Minor Spices • Cumin • Coriander • Fenugreek • Saffron • Tamarind • Cinnamon • Ajwan • Mustard • Mace • Garlic • Onion • Mint • Asafoetida • Nutmeg • Their Post Harvest Technology • Chemical Composition • Processed Products	**15**

• Oleoresins and Volatile Oils **Other Plantation crops** • Vanilla • Cashew nuts • Annatto • Their processing • Quality Control	

References

1. Spices Volume II – Parry J. W.
2. Spices and Condiments – Pruthi J. S.
3. Herbs and Spices – Rosemerry Hemphill
4. The Book of spices – Rosen garten F. & Livington Jr.
5. Spices and herbs for the Food Industry – Lewies Y. S.
6. Spices Vol I & II: Tropical Agril mSeries – Purseglove J. W., Brown E. G., and Robbins SRJ

Semester III
Industrial & Agri Business Management – Paper I
DSC FTM-C5 – Industrial & Agri Business Management - I
Credits 2 (Marks 50) Hours 30, 37.5 Lectures of 48 minutes

Unit – I	Hours Alloted
Introduction to Agribusiness and Fundamentals of Farm Managements • Scope, Nature and Significance of Agriculture business and Modern Agriculture • National Agriculture Policy, Food Processing Policy, Agro industries project and Government Policy • Special features of Agricultural and Industrial Production • Difference between Farm and Non-Farm Business Management **Farm Production System & Farm Technology** • Scientific Farming, Co-operative Farming, Contract Farming and Corporate Farming • Effect of New Technology and Management • Production of Hi-Tech agricultural crops • Gains from technological improvements to producers and consumers mechanism • Automation in agriculture • Role of Biotechnology in Agriculture, Tissue Culture, Green House operation • Commercialization of Agriculture	**15**
Unit II	
Introduction to Industrial Business Management & Forms of Business Organization • Types of Industry, Small scale industry • Procedure to start small scale industry • Definition, objectives and importance of Business • Social responsibilities of Business • Types of business organization – Sole traders, Partnership firm, Co-operative Firm, joint stock company, state enterprise and Public sector organization • Nature, characterization, merits and limitations of each form **Introduction to management and its function** • Nature and characteristics of management • Levels of management • Functional area of management and principles of functional management • Planning – definition, nature, importance, types and stages • Organizing – definition. Importance and types • Staffing – procedure, recruitment, selection	**15**

• Direction - principles	

References

1. Indian Agriculture – Agarwal A.M.
2. Fundamentals of Modern Agriculture – Blake D.
3. Av Introduction to Agricultural production Economics & Farm Management – Robertson.
4. Elements of farm management - Sharma A.M. & Sharma V.K.
5. CFN – 3 Economics of food IGNOU.
6. Management - James A.F.Stone, R.Edward Forman & David R.Gilbert
7. Business administration & Management - Saxena S.C.
8. Industrial Management - Sarma
9. Principles & practice of management - Prasad L.M.
10. Principles of Management - T. Ramasamy

Semester III
Industrial & Agri Business Management – Paper II
DSC FTM-C6 – Industrial & Agri Business Management - II
Credits 2 (Marks 50) Hours 30, 37.5 Lectures of 48 minutes

Unit I	Hours Alloted
Farm Economics, Pricing, Promotion and Distribution • Introduction to Farm Economics and cost of farm products • Economics of Food – factors influencing food expenditure, food price & quality. • Demand, production and supply agricultural produce and products • Estimation of cost of production & problems in cost estimation **Marketing of Agricultural produce/ products** • Introduction, Definition, Classification and structure of Agricultural markets • Marketing of Agricultural produce/ products • Domestic Markets - Regulated Markets, Co-operative marketing • Product decisions – concepts of product, brand, packaging, standardization • Grading in India, Grade determination techniques - AGMARK, BIS • International market for Agricultural products • Difference in domestic & international markets • Grades and standards prevailing in other countries – Qualify standards of Agricultural commodities – ISO 14000, ISO 9000, Quality assurance • India's position in global market and export earnings • Transportation, storage & warehouse	**15**
Unit II	
Production Management and Financial Management • Selection of site, Plant layout - types • Production - Planning - Control • Material management • Methods of purchasing inventory control, Inspection & quality control • Six Sigma • Scope and Importance of Financial Management • Working capital management, sources of funds, elements of cost and break-even analysis **Marketing Management and legal aspects** • Introduction to marketing and selling concepts • Channels of Distribution • Importance, types of Advertising • Market research, E marketing – B to B, B to C • Important provision of Indian Factory act, Employment condition, health aspects, work plan and environment industrial safety	**15**

References

1. Indian Agricultural Economics Myths & Realities – Ashok Rudra
2. Export Management – Prof. Laxmi Narayan
3. Agricultural Marketing in India – S.S.Acharya & M.L.Agarwal.
4. Indian Agriculture – Agarwal A.M.
5. Changing Prospective in Indian Agriculture - Bhanushali S.G. & Pujar A.G. CFN
6. CFN – 3 Economics of food IGNOU
7. International Marketing – Francis cherunilam
8. Business administration & Management - Saxena S.C.
9. Industrial Management - Sarma
10. Principles & practice of management - Prasad L.M.
11. Principles of Management - T. Ramasamy
12. Marketing Management Practice - Kotlar Philip

Semester IV
Processing & Preservation of Fruits & vegetables -Paper I
DSC FTM –D1- Processing & Preservation of Fruits & Vegetables I
Credits 2 (Marks 50) Hours 30, 37.5 lectures of 48 Minutes

Unit – I	Hours Allotted
Introduction to Fruits • Morphology of fruits • Classification of fruits • Composition of fruits • Nutritive value of fruits • Biochemical changes in fruits **Introduction to Vegetables** • Morphology of Vegetables • Classification of Vegetables • Composition of Vegetables • Nutritive value of Vegetables • Biochemical changes in Vegetables **Techniques of Fruits & Vegetables Processing** • Current Status of Production & Processing of Fruits & Vegetables • Canning of Fruits & Vegetables – Principle & Process • Containers for Packing of Canned Products – Tin Cans & Glass containers • Bottling of Fruits – Filling, Syruping, Exhausting • Canning of Curied Vegetables • Causes of Spoilage of Canned Foods – Physical, Chemical & Microbial Changes	**15**
Unit – II	
Drying/Dehydration of Fruits & Vegetables • Sun-drying of Fruits & vegetables • Factors affecting rate of Drying/Dehydration • Principle & Pretreatments for drying/dehydration • Process of Drying/Dehydration of fruits & vegetables • Types of Driers – Air Convection Driers, Drum/Roller Driers, Vacuum Driers	

• Spoilage of Dried Products • Reconstitution test for Dried/Dehydrated Products • Food Concentration – Methods of Concentration • Changes during Concentration **Freezing of Fruits & Vegetables** • Freezing Process for Fruits & Vegetables • Sharp Freezing, Cryogenic freezing • Quick Freezing – Methods • Changes during Freezing • Changes during Storage	**15**

References

1) Fruit & Vegetable Preservation, Principles and Practices - R P Shrivastav & Sanjeev Kumar
2) Preservation of fruits and vegetables - Girdhari Lal & T D Tandon
3) Principles of Fruit Preservation – T.N. Morris
4) Handbook of fruit science and technology - Salunkhe D.K, Kadam S.S
5) Preservation of fruit and vegetables - Bhatiya Vijaya
6) Fruits: Tropical & Subtropical- T K Bose, S K Mitra, D Sanyal.
7) Modern Technology of Tomato Processing & Dehydration – EIRI Board of Consulants & Engineers.
8) Food preservation Techniques – Atul Agnihotri
9) Fruit & Vegetable preservation – N.P.Singh
10) Fruit & Vegetable Preservation Techniques – R. K. Narang

Semester IV
Processing & Preservation of Fruits & vegetables -Paper II
(DSC FTM –D2- Processing & Preservation of Fruits & Vegetables II)
Credits 2 (Marks 50) Hours 30, 37.5 lectures of 48 Minutes

Unit – I	Hours Allotted
Fruit Processing • Fruit Beverages: Unfermented • Preparation & Preservation of Unfermented Beverages • Unfermented Beverages: Juice - Processing • RTS, Squash, Cordial – Specifications & Processing • Jam – Specifications, Processing & Problems in Jam Production • Jelly & Marmalade – Specifications, Processing & Problems in Jelly Production • Preserve & Candy - Specifications, Processing & Problems in Jelly Production • Glazed & Crystallized Fruits **Vegetable Processing** • Pickles – Types of Pickles • Problems in Pickle Making • Defects & Spoilage in Pickles • Saurkraut – Principle, Processing • Defects & Spoilage in Saurkraut • Chutneys – Processing • Tomato Processing • Tomato Juice, Puree & Paste • Tomato Sauce/Ketchup – Specifications & Processing • Tomato Soup & Tomato Chilli Sauce • Potato Processing – Important Considerations • Processing of Potato Chips/Wafers • Processing of French Fries (Frozen Potato Chips) • Green Olives – Processing, Defects & Spoilage • Ripe Olives – Processing, Defects & Spoilage	**20**
Unit II	

Value Added Products from Processing • Mushroom Processing • Drying/Dehydration of Mushroom • Pickling & Lactic acid Fermentation of Mushrooms • Some Other Valuable Products from Fruits & Vegetables • Processing of Amchur • Processing of Mango Leather • Processing of Fruit Cheese • Processing of Fruit Butter • Processing of Fruit Toffee • Processing of Papain	**10**

References

1) Fruit & vegetable preservation, Principles and Practices - R P Shrivastav & Sanjeev Kumar
2) Preservation of fruits and vegetables - Girdhari Lal & T D Tandon
3) Principles of Fruit Preservation – T.N. Morris
4) Handbook of fruit science and technology - Salunkhe D.K, Kadam S.S.
5) Preservation of fruit and vegetables - Bhatiya Vijaya
6) Fruits: Tropical & Subtropical- T K Bose, S K Mitra, D Sanyal
7) Modern Technology of Tomato Processing & Dehydration – EIRI Board of Consulants & Engineers
8) Food preservation Techniques – Atul Agnihotri
9) Fruit & Vegetable preservation – N.P.Singh
10) Fruit & Vegetable Preservation Techniques – R. K. Narang

Semester IV
Food Biochemistry– Paper I
(DSC FTM- D3 – Food Biochemistry-I)
Credits 2 (Marks 50) Hours 30, 37.5 Lectures of 48 minutes

Unit – I	**Hours Alloted**
Solutions • Acids and alkalies • Buffer solutions • Types of solutions • Colloidal solutions **Tools of Biochemistry** • Chromatography • Electrophoresis • Colorimeter and spectrophotometer • Flame Photometer • Atomic absorption Spectroscopy •	**15**
Unit – II	
Enzymes • Definition and Classification • Activesite of enzyme, Enzyme specificity • Mechanism of enzyme action • Factors affecting enzyme activity • Coenzymes • Applications of enzymes • Diagnostic use of enzymes **Hormones** • Definition and Classification • Mechanism of action • Biochemical functions and disorders of pituitary, thyroid, adrenal, parathyroid and pancreatic hormones • Gastrointestinal hormones	**15**

References:

1. Biochemistry -U Satyanarayna, U. Chakrapani
2. Fundamentals of Biochemistry-Dr.A.C. Deb
3. Biochemistry -Lubert Stryer
4. Fundamentals of Biochemistry - J.L. Jain
5. Lehninger's Principles of Biochemistry - D. L. Nelson and M. M. Cox

Semester IV
Food Biochemistry– Paper II
(DSC FTM- D4 – Food Biochemistry-II)
Credits 2 (Marks 50) Hours 30, 37.5 Lectures of 48 minutes

Unit – I	Hours Alloted
Introduction to metabolism • Catabolism • Metabolism • Methods to study metabolism **Metabolism of Carbohydrates** • Digestion and Absorption of Carbohydrates • Glycolysis • Kreb's cycle • Electron Transport Chain • Gluconeogenesis • Glycogen metabolism • Gluconeogenesis • HMP pathway • Galactose metabolism • Fructose metabolism	**15**
Unit – II	
Lipid metabolism • Digestion and absorption of Lipids • Oxidation of fatty acids • Ketone bodies • Lipoproteins • Adipose tissue **Protein metabolism** • Digestion and absorption of proteins • Transamination • Deamination • Urea cycle	**15**

References:

1. Biochemistry -U Satyanarayna, U. Chakrapani
2. Fundamentals of Biochemistry-Dr.A.C. Deb
3. Biochemistry -Lubert Stryer
4. Fundamentals of Biochemistry - J.L.Jain
5. Lehninger's Principles of Biochemistry - D. L. Nelson and M. M. Cox

Semester IV
Food Packaging -Paper I
DSC FTM –D5-Food Packaging I
Credits2 (Marks 50) Hours 30, 37.5 lectures of 48 Minutes

Unit – I	Hours Allotted
Introduction of Food Packaging • Introduction to food Packaging • Package functions • Hazards acting on package during transport and storage • Need of Packaging • Role of packaging in extending shelf life of food • Classification of packages-Primary, secondary & Tertiary • Classification of polymers and packaging materials **Introduction of Packaging Material** • Low Density Polyethylene,LLDPE,MDPE,HDPE • Polypropylene,Castpolypropylene,polystyrene,EVA,PVC,PVDC,PTFE • PET,NYLON, Modified Cellulose, laminate, co-extruded films • Types of Packaging materials • Use of metals as a packaging material-tinplate containers, tinning process and components, types of cans ,lacquering • Use of paper as packaging material-Pulping, fibrillation, Beating ,types of paper • Use of glass as packaging material-Composition, properties, types, methods of bottle making. • Various types of caps.	**15**
Unit - II	
Terminologies Used in packaging • Thickness • Tensile Strength • The Bursting Strength • Water VapourTransition Rate • Gas Transition Rate& Oxygen Transition Rate • Grease and Tear Resistance for papers • Impact strength test for Plastics • The Abrasion Resistance • Heat seal strength • Environment Stress Cracking • Sorption Behavior • Sterilization of packaging material	**15**

• Shelf life of packaged foods	

References

1. A Handbook On Food Packaging ,P.Jacob John
2. Food Packaging ,Prof.NeelamKhetarpaul and Dr.DarshanPunia
3. Food Packaging , Takashi Kadoya
4. Handbook of Food Processing , Packaging and Labelling, Jerry D'souza and JatinPradhan
5. Aseptic Processing & Packaging of Food A Food Industry Perspective, Jairus R.D David, Ralph H. Graves and V.R. Carlon
6. Innovations in Food Packaging (second Edition), Jung H. Han

Semester IV
Food Packaging -Paper II
DSC FTM –D6-Food Packaging II
Credits2 (Marks 50) Hours 30, 37.5 lectures of 48 Minutes

Unit – I	Hours Allotted
Packaging Accessories and Advances in packaging Technology • Introduction • Active packaging • Controlled and Modified atmospheric packaging (CAP and MAP) • Aseptic packaging • Packages for microwave ovens • Biodegradable packaging • Edible gums and coating • Vacuum packaging machine • CA & MA packaging machine • Gas Packaging machine • Seal and Shrink packaging machine • Form and Fill Sealing machine • Retort pouches • Bottling machine and carton making machine • Testing and performance of packaging material • Different forms of packaging material • Rigid ,semi rigid, flexible forms of packaging • Principles in development of safe and protective packing	**15**
Unit II	
Different Packaging Systems for processed foods • Different packaging systems for-Dehydrated foods(snacks) • Frozen foods and beverages • Dairy Products • Fresh and vegetables • Bakery & cereals • Meat, poultry and sea foods • Novel Food Packaging for space foods • Importance of Eco- friendly packaging and sustainability **Packaging Laws and regulations** • Laws and regulations affecting food products • Class A & Class B commodities • General guidelines on giving declaration according to FSSAI	**15**

• Physical distribution of packaged foods • New trends in packaging design • Emerging Packaging industry trends • Biodegradable packaging in food industry • The vision for future packaging	

References

1. International Pvt. Ltd. New Delhi- 110 002A Handbook On Food Packaging ,P.Jacob John
2. Food Packaging ,Prof.NeelamKhetarpaul and Dr.DarshanPunia
3. Food Packaging , Takashi Kadoya
4. Handbook of Food Processing, Packaging and Labelling, Jerry D'souza and JatinPradhan
5. Aseptic Processing & Packaging of Food A Food Industry Perspective, Jairus R.D David, Ralph H. Graves and V.R. Carlon
6. Innovations in Food Packaging (second Edition), Jung H. Han

DSC FTM- P2- LAB COURSE V

Sr.No	Name of the Experiment
1.	Morphological Characteristics of cereals
2.	Physical properties of cereals
3.	To study the cooking quality of rice
4.	To study the effect of kneading on development of gluten
5.	Process of flaking
6.	Process of puffing
7.	Parboiling of rice
8.	Malting of cereals
9.	Cooking of dal
10.	Sprouting of pulses
11.	Process of popcorn
12.	Preparation of extruded product i.e. noodles
13.	Preparation of Peanut butter
14.	Preparation of Instant dhokla mix
15.	Preparation of Protein rich product
16.	Preparation of mini bakarwadi
17.	Preparation of nachos
18.	Preparation of mustard sauce
19.	Preparation of instant kheer
20.	Development of product from makhana
21.	Preparation of Soya sticks
22.	Preparation of Soya Sauce
23.	Preparation of Chikki

24.	Preparation of khari dal/ salted moong dal
25.	Preparation of Tofu
26.	Preparation of Tahini
27.	Preparation of Snack bar
28.	Preparation of Hummus
29.	Preparation of Baby food mix
30.	Preparation of Khakra
31.	Measurement of thickness of paper and paper boards
32.	Measurement of water absorption of paper and paper boards
33.	Measurement of bursting strength of paper and paper boards
34.	Measurement Tear resistance of papers
35.	Measurement of puncture resistance of paper and paperboard
36.	Measurement of tensile strength of paper of paper boards
37.	Determination of gas transmission rate of package films
38.	Determination of WVTR and Gas transmission rate of film
39.	Identification of Packaging materials
40.	Edible packaging of Food Products (Fruits, Bread, Dairy)
41.	Estimation of shelf life of packaged food stuff

DSC FTM-P6-LAB COURSE VI

Sr.No	Practicals
1.	Study of Equipments for Fruits and Vegetables Processing
2.	Canning of Fruits and Vegetables
3.	Preparation of Apple Jam
4.	Preparation of Mix Fruit Jam
5.	Preparation of Jelly
6.	Preparation of Marmalade
7.	Preparation of Lemon RTS
8.	Preparation of Ginger RTS
9.	Preparation of Mango RTS
10.	Preparation of Pineapple Squash
10.	Preparation of Orange Squash
11.	Preparation of Syrup
12.	Preparation of Nectar
13.	Preparation of Cordial
14.	Preparation of Fruit candy
15.	Preparation of Murambba
16.	Preparation of Potato Wafers
17.	Preparation of Tomato Soup
18.	Preparation of Tomato Chutney
19.	Preparation of Tomato Sauce/Ketchup
19	Preparation of Chilli Pickle
20	Preparation of Lemon Pickle
21	Preparation of Mixed Vegetable Pickle
22	Preparation of Saurkraut
23	Preparation of Fruit or Vegetable Leather
24	Preparation of Carrot Dessert (Halwa)
25	Drying and Dehydration of Fruits and Vegetables
26	Utilization of Dried Fruits & Vegetables
27	Preparation of Fruit Cheese
28	Preparation of Fruit Butter

29	Preparation of Banana Wafers
30	Preparation of Chyavanprash
31	Preservation of Green Peas by Freezing
32	Products & By-products of Spices & Plantation Crops
33	Formulation & Quality Evaluation of Pav Bhaji Masala
34	Formulation & Quality Evaluation of Sambar Masala
35	Preparation of Instant Soup Mix
36	Determination of Physiological Loss in Weight of fruits & Vegetables Under ambient & Refrigerated Index
37	Judging The Maturity of Fruits & Vegetables
38	Extraction of Aromatic Oils from Different Spices

DSC FTM-P 7 - LAB COURSE VII

Sr. No.	Name of Experiment
1.	Study of glasswares
2.	Preparation of solutions
3.	Study of Laboratory equipments
4.	Qualitative tests for Carbohydrates
5.	Qualitative tests for Proteins
6.	Isolation of Starch from potato
7.	Isolation and characterization of Caesin from Milk
8.	Determination of Iodine value of Oil
9.	Determination of Saponification value of Oil
10.	Determination of Acid value of Oil
11.	Determination of Peroxide value of Oil
12.	Estimation of Protein by Biuret Method
13.	Estimation of Starch by Anthrone Method
14.	Verification of Beer's And Lambert's law
15.	Pectin content of different fruit extracts
16.	Effect of Browning of Fruits and Vegetables
17.	Study of gelatinization property from fruits and vegetables
18.	To determine the smoke point of fats and oils
19.	To study the microscopic structure of food starches
20.	Effect of heat on fruits and vegetables
21.	Effect of acid and alkali on fruits and vegetables
22.	Effect of method of cooking on coagulation property of egg

Date- / /2019

To,
Deputy Registrar,
Board of studies,
Shivaji University,
Kolhapur.

Subject: - Submission of CBCS syllabus for B.Sc. FTM II (Semester III & IV)

Respected Sir,

Herewith I am submitting you the syllabus of B.Sc. FTM II (Semester III & IV) to be implemented from June 2020 onwards.

Thanking you.

Yours Faithfully,

Dr. A. K. Sahoo
Chairman
SUK, Kolhapur.