SHIVAJI UNIVERSITY, KOLHAPUR.

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Accredited By NAAC with 'A' Grade
CHOICE BASED CREDIT SYSTEM

Syllabus For

B.Sc. Part - III

Food Technology and Managemnt (Entire)

SEMESTER V AND VI

(Syllabus to be implemented from June, 2021- onwards.)

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B.Sc. Part - III

Food Technology and Management (Entire)

SEMESTER V AND VI

(Syllabus to be implemented from June, 2021- onwards.)

Structure of B. Sc. Food TechnologyandManagement(Entire)ProgrammeSemV Aand VI

Structure - III

Sr. No.	Subject Title	TEACHING SCHEME						EXAMINATION SCHEME						
		THEORY			PRACTICAL			THEORY				PRACTICAL		
		Credits	No. of lectures	Hours	Credits	No. of lectures	Hours	Hours	Theory	Internal	Min Marks	Hours	Max Marks	Min Marks
SEMESTER – V (Duration – 6 Months)														
1	DSE-FTM-E1	2	3	2.4	2	5	4	2	40	10	14+4=18	PRACTICAL EXAMINATION IS ANNUAL		
2	DSE-FTM-E2	2	3	2.4	2	5	4	2	40	10	14+4=18			
3	DSE-FTM–E3	2	3	2.4	2	5	4	2	40	10	14+4=18			
4	DSE-FTM–E4	2	3	2.4	2	5	4	2	40	10	14+4=18			
5	AECC-E	2	4	3.2	---	---	---	2	40	10	14+4=18			
	TOTAL	10	16	12.8	8	20	16		200	50	---			
SEMESTER – VI (Duration – 6 Months)														
1	DSE-FTM–F1	2	3	2.4	2	5	4	2	40	10	14+4=18	As per BOS Guidelines	50	18
2	DSE-FTM–F2	2	3	2.4	2	5	4	2	40	10	14+4=18		50	18
3	DSE-FTM–F3	2	3	2.4	2	5	4	2	40	10	14+4=18		50	18
4	DSE-FTM–F4	2	3	2.4	2	5	4	2	40	10	14+4=18		50	18
5	AECC-F	2	4	3.2	---	---	---	2	40	10	14+4=18	---	---	---
TOTAL		10	16	12.8	8	20	16		200	50	---			
GRAND TOTAL		20	32	25.6	16	40	32		400	100	--	---	200	

- Student contact hours per week: 32 Hours (Min)
- Theory and Practical Lectures: 48 Min. Each
- Total Marks for B.Sc.-III (Including English): 700
- Total Credits for B.Sc.-III (Semester V & VI): 36
- **DSE- Discipline Specific Elective:** All papers are compulsory.
- **AECC**- Ability Enhancement Compulsory Course (E & F): English
- Practical Examination will be conducted annually for 200 Marks.
- ***There shall be separate passing for theory, internal and practical.***

(A) Non-Credit Self Study Course: Compulsory Civic Courses (CCC)
For Sem V: CCC – II: Constitution of India and Local Self Government

(B) Non-Credit Self Study Course:Skill Development Courses (SDC)
For Sem VI: SDC – II: Any one from following (vi) to (x)
vi) Interview & Personal Presentation Skill, vii) Entrepreneurship Development Skill, viii) Travel & Tourism, ix) E-Banking & Financial Services, x) RTI & Human Right Education (HRE), IPR & Patents

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

B.Sc. FTMPart3 (SemV& VI)

Course code	Name of Course	Course code	Name of Course
Sem V		**Sem VI**	
DSE FTM-E1	Animal Product Technology-I	**DSEFTM-F1**	Animal Product Technology-II
DSE FTM-E2	Bakery and Confectionery –I	**DSE FTM-F2**	Bakery and Confectionery –II
DSE FTM-E3	Food Quality Control, Safety and Waste Management-I	**DSE FTM-F3**	Food Quality Control, Safety and Waste Management-II
DSE FTM-E4	Beverage Technology-I	**DSE FTM-F4**	Beverage Technology–II
AECC – E	English – III	**AECC – F**	English – IV

Practical

DSE FTM-P8	Lab Course VIII (Based on DSE FTM-E2 & DSC FTM-F2)	**DSE FTM-P10**	Lab Course X (Based on DSE FTM-E4 & DSC FTM-F4)
DSE FTM-P9	Lab Course IX (Based on DSE FTM-E3 & DSC FTM-F3)	**DSE FTM-P11**	Project

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Semester V

Animal Product Technology – PaperI

(DSC FTM-E1 –Animal Product Technology--I)

Credits 2 (Marks 50) Hours 30, 37.5 Lectures of 48 minutes

Unit – I	Hours Alloted
Introduction of meat and slaughtering of animals Pre-slaughter transport and care and antimortem inspection Slaughtering of animals, post-mortem inspection and grading of meat Pre and post slaughter operations, Classification and Structure and composition of meat Nutritive value of meat **Processing and preservation of meat** Manufacture of meat products and packaging. Recent concepts in animal product processing Aging or chilling, freezing, pickling, curing, cooking and smoking of meat Meat tenderization, gelation preparation Preservation with antibiotics, radiations,	**15**
Unit – II	
Structure, Composition and Quality of Egg Structure, composition of egg Nutritive value of egg Evaluation of quality and grading of eggs **Processing and Preservation of eggs** Egg processing – freezing, drying and canning Preservation of shell eggs Effect of heat on egg protein. Egg foams and factors influencing. Preparation of protein concentrate	**15**
References: 1) Manay S.N. and Shadaksharaswamy M. (2001); Food facts and principles, 2nd edn, New Age International (P) limited publishers. 2) Potter N. N. and Hotchkiss J.H. (1966); Food Science, 5th edn., CBS Publishers and distributors. 3) Shrilakshmi B. (2003); Food Science, 3rd edn., New Age International (P) limited publishers.	

Semester V
Bakery and Confectionary – Paper I
(DSC FTM-E2 –Bakery and Confectionary--I)
Credits 2 (Marks 50) Hours 30, 37.5 Lectures of 48 minutes

Unit – I	Hours Alloted
Introduction to bakery Ingredients Varieties & types Qualities & Grades Chemical constituents Physiological & rheological properties Role & functions of bakery products **Bakery organization & Equipment** Bakery organization Layout for small bakery Small equipments & their uses Large equipments & their uses Sanitation & hygiene in bakery unit	15
Unit – II	
Introduction to Confectionary Principles of confectionary manufacture Traditional confectionary goods Types & classification of confectionary Quality parameters of confectionary products Equipments used in confectionary industry Sanitation & hygiene in confectionary unit **Confectionary Ingredients** Role of starch, fats, color, flavor, additives Liquid sweeteners - molasses, high fructose syrup, corn syrup, maple syrup Reactions of sugar- caramelization, hydrolysis, and crystallization, sugar boiled confectionery properties of boiled sugar confections	15

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References:

1. Matz. S.A (1996): Bakery technology & engineering, 1st edition, Arya book depot, New delhi.
2. Practical baking cooking 1st edition, queen street house, UK.
3. Kamel B.S. &stauffer C.E. (1993): Advances in baking technology, 1st edition, Blackie academic & professional.
4. Aylwaed F. (2001): Food technology processing & quality control, 1st edition, Agrobios (India).
5. Harry W., Loesecke (2001): Outlines of food technology, 2nd edition, Agrobios (India).

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Semester V

Food Quality Control, Safety and Waste Management-PaperI

(DSC FTM-E3 – Food Quality Control, Safety and Waste Management--I)

Credits 2 (Marks 50) Hours 30, 37.5 Lectures of 48 minutes

Unit – I	Hours Alloted
Introduction to Food quality Definition of Food quality, Quality attributes of food, Objectives of quality control, Role and responsibilities of quality control, Quality assurance Sampling techniques and preparation of Sample Sensory evaluation of foods Texture evaluation of foods Concept of colour in food quality Color measurement methods Concept of flavor in food quality	15
Unit – II	
Food safety and security. Food laws and standards – ISO 9000 and ISO 14000 Indian food laws and regulations – Prevention of Food Adulteration Act, Food safety and standards act 2006 Functions of FSSAI, Food Licensing and Registration, General provisions as to article of food, provisions related to import, enforcement of act, Offences and penalties, regulations for labelling and packaging. Voluntary Standards: BIS and AGMARK Objectives, Salient features.	15
References: 1. The Food Safety and Standards Act, 2006. Professional Book Publishers, Delhi. 2. Quality Control for Food Industry - Krammer & Twigg 3. Food Science – Norman N. Potter, Joseph H. Hotchkiss,CBS Publishers and distributors, New Delhi, 1997 5th edition. 4. Ranganna S. 2012 Handbook of analysis and quality control for fruits and vegetable products, Tata McGraw Hill Education Pvt. Ltd., New Delhi	

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Semester V

Beverage Technology- PaperI

(DSC FTM- E4–Beverage Technology --I)

Credits 2 (Marks 50) Hours 30, 37.5 Lectures of 48 minutes

Unit – I	Hours Alloted
Introduction to Beverages History and Types of beverages and their importance; status of beverage industry in India;FSSAI specifications for beverages, Ingredients, manufacturing and packaging processes and equipment for different beverages. **Packaged drinking water** Definition, types, manufacturing processes, quality evaluation and raw and processed water, methods of water treatment, BIS quality standards of bottled waterbeverages	15
Unit – II	
Non-Alcoholic Beverages Types of Non-alcoholic beverages Soft drink – Introduction, Raw material, Manufacturing process, Quality control. Apple Cider – Introduction, History, Raw material, Fermentation Changes in apple cider composition during fermentation and maturation. **Carbonated Beverages** Introduction to Carbonated beverages Soft drink manufacturing process, Ingredients used in preparation of Carbonated beverages Manufacturing process of Carbonated beverages Low calorie beverages	15

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References

1. Handbook of Fermented foods and Beverage Technology- Ravinder A, SriniviasMaloo, Fr. Dr. Emmanuel S.J.- Himalaya Publishing House.
2. Fruit and Vegetable Juices Tressler D.K., Joslyn M.A. and
3. Marsh G.C. AVI publishing company New York 1971 2 Food and Beverage Technology International
4. USA Bernard and Alan Sterling Publication, 1989 3 Beverages: Technology, Chemistry and
5. McirobiologyVarnam and Sutherland Springer, 1994 4 Manufacturing of Food and Beverages NIIR
6. Board NIIR Publication, New Delhi REFERENCE BOOKS Sr. No. Name of Book Author Publisher 1 Food
7. Flavourings P.R. Ashust Springer, 2012 2 Handbook of Alcoholic Beverages Alan Buglass John Wiley
8. and Sons, 2011 3 Beverages Pare Jean Company's Coming Publishing Limited, 1997 4 Preservation of
9. Fruit and Vegetable Products Girdharilal, Siddappa, Tondon Indian Council of Agricultural Research,

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Semester VI
Animal Product Technology – Paper II
(DSC FTM-FI –Animal Product Technology--II)
Credits 2 (Marks 50) Hours 30, 37.5 Lectures of 48 minutes

Unit – I	Hours Alloted
Slaughtering of poultry, structure & composition of poultry birds Pre-slaughter transport and care and antimortem inspection Slaughtering of poultry, post-mortem inspection and grading of poultry meat Structure and composition of poultry meat Nutritive value of poultry meat **Processing and preservation of poultry meat** Manufacture of poultry products Preservation of poultry meat Sources and developments of meat and poultry industries and importance in national economy By-products utilization of abattoir	15
Unit – II	
Structure and composition of fish Types and Classification of Fish Structure of fish Composition and Nutritive value of fish Post mortem changes **Processing and preservation of fish** Spoilage of fish Processing of fish meal, fish flour, fish – oil. Canning and freezing of fish Fish cookery Commercial fish handling, preservation & transport Preparation of various fish products	15
References: 1) Manay S.N. and Shadaksharaswamy M. (2001); Food facts and principles, 2nd edn, New Age International (P) limited publishers. 2) Potter N. N. and Hotchkiss J.H. (1966); Food Science, 5th edn., CBS Publishers and distributors.3) Shrilakshmi B. (2003); Food Science, 3rd edn., New Age International (P) limited publishers.	

Semester VI
Bakery and Confectionary – Paper II
(DSC FTM-E2 –Bakery and Confectionary--I)
Credits 2 (Marks 50) Hours 30, 37.5 Lectures of 48 minutes

Unit – I	Hours Alloted
Ingredients & process for bread Ingredients & manufacturing of Buns, Pizza base Equipments used in the manufacturing of bread Product quality characteristics Faults & corrective measures Staling & losses in baking **Manufacturing of cakes** Manufacturing of biscuits Manufacturing of cookies & crackers Products quality characteristics of cakes, cookies & biscuits Equipments used in the manufacturing of bread Product quality characteristics Faults & corrective measures	15
Unit – II	
Modified bakery products Modification of bakery products with special nutritional requirements High fiber products Low sugar products Law fat products Low fat gluten free products **Manufacturing of confectionary products** Manufacturing of caramel Manufacturing of toffee Manufacturing of fudge Manufacturing of fondant Hard boiled sweets Standards & regulation Color, flavor & texture of confectionary	15
References: 1. Matz. S.A (1996): Bakery technology & engineering, 1st edition, Arya book depot, New delhi. 2. Practical baking cooking 1st edition, queen street house, UK. 3. Kamel B.S. &stauffer C.E. (1993): Advances in baking technology, 1st	

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Semester VI

Food Quality Control, Safety and Waste Management-PaperII

(DSC FTM- F3 – Food Quality Control, Safety and Waste Management--II)
Credits 2 (Marks 50) Hours 30, 37.5 Lectures of 48 minutes

Unit – I	Hours Alloted
Various Organizations in the area of Food standardization and quality Food and Agriculture organization, World Health organization, World Trade Organisation, Export inspection agency, Global gap, United states Department of Agriculture, USFDA, Food and Drug Administration Codex Alimentarius commission Food safety Management System-Introduction, principles of food safety Factors affecting Food Safety, Physical Hazards, Chemical hazards, Biological Hazards, HACCP, ISO: 22000, FSSC, BRC, PRPs (GAP, GMP, GHP, GSP.)	15
Unit – II	
Industrial byproducts and waste utilization Potential & prospects of byproduct & waste utilization from the food Industries in India Byproduct & waste with special reference to cereal & cereal product, fruitsand vegetable, meat,Poultry and fish, milk & milk products Effect of processing on processing and storage on food quality.	15
References: 1. Food Science-Sumati R Mudambi, Shalini Rao & M.V. Rajagopal. 2. Food facts and principles – Shakuntala Manay 3. Quality Control for Food Industry - Krammer & Twigg 4. Food Science –B Srilaxmi 5. Ranganna S. 2012. Handbook of analysis and quality control forfruits and vegetable products, Tata McGraw Hill Education Pvt. Ltd., New Delhi 6. Pomeranz Y and Meloan C. 2000. Food Analysis: Theory and Practice. Aspen Publication, Marylan	

Semester VI
Beverage Technology-PaperII
(DSC FTM- F4–Beverage Technology --II)
Credits 2 (Marks 50) Hours 30, 37.5 Lectures of 48 minutes

Unit – I	Hours Alloted
Alcoholic Beverages **Wine** Introduction to wine Types and classification of Wine Manufacturing of Wine Chemistry and Microbiology of wine Defects in Wine **Beer** Introduction Types and classification of Beer Beer ingredients Manufacturinng of Beer Chemistry and Microbiology of Beer Defects in Beer	15
Unit – II	
Distilled Alcoholic Beverages Introduction Types of Distilled alcoholic Beverages Raw materials and Manufacturing of – Whiskey, Rum, Vodka, Brandy and Gin **Miscellaneous beverages** Coconut water, sweet toddy, sugar cane juice, coconut milk, flavoured syrups mineral water, natural spring water, flavoured water, carbonated water	15

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1. Handbook of Fermented foods and Beverage Technology- Ravinder A, SriniviasMaloo, Fr. Dr. Emmanuel S.J.- Himalaya Publishing House.
2. Fruit and Vegetable Juices Tressler D.K., Joslyn M.A. and
3. Marsh G.C. AVI publishing company New York 1971 2 Food and Beverage Technology International
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5. McirobiologyVarnam and Sutherland Springer, 1994 4 Manufacturing of Food and Beverages NIIR
6. Board NIIR Publication, New Delhi REFERENCE BOOKS Sr. No. Name of Book Author Publisher 1 Food
7. Flavourings P.R. Ashust Springer, 2012 2 Handbook of Alcoholic Beverages Alan Buglass John Wiley
8. and Sons, 2011 3 Beverages Pare Jean Company's Coming Publishing Limited, 1997 4 Preservation of
9. Fruit and Vegetable Products Girdharilal, Siddappa, Tondon Indian Council of Agricultural Research,

DSC FTM Lab course VIII

Sr no	Name of Experiment
1.	Preparation of Cakes
2.	Preparation of Plum cake
3.	Preparation of Cheese cake
4.	Preparation of Sponge cake
5.	Preparation of Pastry cake
6.	Preparation of Biscuits
7.	Preparation of Glucose biscuits
8.	Preparation of Ragi biscuits
9.	Preparation of Digestive biscuits
10.	Preparation of Bread
11.	Preparation of Buns
12.	Preparation of Pizza base
13.	Preparation of Multigrain bread
14.	Preparation of Apple pie
15.	Preparation of Fondant
16.	Preparation of Fudge
17.	Preparation of Toffee
18.	Preparation of Candy
19.	Preparation of Plain &centre filled chocolates
20.	Preparation of Muffins

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DSE FTM-P9Lab Course IX

Sr. No.	Name of Experiment
1.	Detection of basic tastes and their threshold values
2.	Sensory evaluation by different methods
3.	Detection of Adulteration in Common Food Products
4.	Estimation of Moisture Content- Lab Oven Method
5.	Estimation of Ash Content
6.	Estimation of Fibre Content
7.	Estimation of Protein Content
8.	Estimation of Fat content
9.	Determination of overrun of ice-cream
10.	Study of Relative sweetness of different sweeteners
11.	Quality evaluation of product for size and shape
12.	Quality evaluation of egg
13.	Determination of Water holding capacity of various food samples.
14.	Analysis of color by using Lovibond Tintometer
15.	Analysis of Color by Hunter Colorimeter
16.	Determination of Viscosity by Brookfield viscometer
17.	Determination of Viscosity by using pipette
18.	Determination of Texture of food by Texture analyzer
19.	Qualitative test for presence of benzoic acid in foods
20.	Qualitative test for detection of presence of non-nutritive sweeteners

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DSE FTM-P10 Lab Course X

Sr no	Name of Experiment
1.	Physical properties of water
2.	Determination of hardness of water and beverages
3.	Microbial Analysis of water for e coli
4.	Preparation of whey based fermented beverages
5.	Perparation of Iced and Flavored Tea
6.	Quality analysis of Tea and coffee
7.	Determination of Brix value of beverages
8.	Determination of pH and acidity of beverages
9.	Determination of saccharin in beverages
10.	Determination of benzoic acids in beverages
11.	Determination of sulphur dioxide in beverages
12.	Determination of caffein in cola type of beverage
13.	Visit to Carbonation unit
14.	Visit to Mineral water plant
15.	Visit to water treatment plant

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