Estd. 1962
"A++" Accredited by NAAC (2021)
With CGPA 3.52

SHIVAJI UNIVERSITY, KOLHAPUR - 416004, MAHARASHTRA
PHONE:EPABX-2609000, www.unishivaji.ac.in, bos@unishivaji.ac.in
शिवाजी विद्यापीठ, कोल्हापूर -४१६००४,महाराष्ट्र
दूरध्वनी-ईपीएबीएक्स -२६०९०००, अभ्यासमंडळे विभाग दुरध्वनी ०२३१—२६०९०९४
०२३१—२६०९४८७

SU/BOS/Science/06 **Date: 01/01/2024**

To,

The Principal, All Concerned Affiliated Colleges/Institutions Shivaji University, Kolhapur	The Head/Co-ordinator/Director All Concerned Department (Science) Shivaji University, Kolhapur.

Subject: Regarding syllabi of B.Sc. Part-III (Sem. V & VI) as per NEP-2020 (1.0) degree programme under the Faculty of Science and Technology.

Sir/Madam,

With reference to the subject mentioned above, I am directed to inform you that the university authorities have accepted and granted approval to the revised syllabi, nature of question paper and equivalence of B.Sc. Part-III (Sem. V & VI) as per NEP-2020 (1.0) degree programme under the Faculty of Science and Technology.

B.Sc.-III (Sem. V & VI) as per NEP-2020 (1.0)			
1.	Mathematics	12.	Computer Science (Opt)
2.	Statistics	13.	Computer Science (Entire)
3.	Physics	14.	Information Technology (Entire)
4.	Microbiology	15.	Food Science and Technology (Entire)
5.	Industrial Microbiology	16.	Food Science
6.	Electronics	17.	Food Science and Quality Control (Entire)
7.	Chemistry	18.	Food Technology &Management (Entire)
8.	Sugar Technology (Entire)	19.	Biochemistry
9.	Geology	20.	Biotechnology (Optional/Vocational)
10.	Zoology	21.	Biotechnology (Entire)
11.	Botany	22.	Environmental Science (Entire)

This syllabus, nature of question and equivalence shall be implemented from the academic year 2024-2025 onwards. A soft copy containing the syllabus is attached herewith and it is also available on university website www.unishivaji.ac.in NEP-2020(Online Syllabus)

The question papers on the pre-revised syllabi of above-mentioned course will be set for the examinations to be held in October /November 2024 & March/April 2025. These chances are available for repeater students, if any.

You are, therefore, requested to bring this to the notice of all students and teachers concerned.

Thanking you,

Dy Registrar
Dr. S. M. Kubal

Copy to:

SHIVAJI UNIVERSITY, KOLHAPUR.

Accredited By NAAC with 'A+++' Grade Syllabus For

B.Sc.Part- III

Food Science & Quality Control

SEMESTER VAND VI

(Syllabus as per NEP 2020 to be implemented from June, 2024 onwards.)

SYLLABUS OF B.Sc.III (Food Science and Quality Control) (NEP 2020)

TO BE IMPLEMENTED FROM JUNE 2024 ONWARDS

- Guidelines shall be as per B.Sc. Regular Program.
- Rules and Regulations shall be as per B.Sc. Regular Program except CBCS R. B. Sc. 3 Structure of Program and List of Courses.
- Preamble:

  This syllabus is framed to give sound knowledge with understanding of Food Science and Quality Control to undergraduate students of B. Sc. Food Science and Quality Control Program. The goal of the syllabus is to make the study of Food Science and Quality Control popular, interesting and encouraging students for higher studies including research.

B.Sc. (Food Science and Quality Control) Program

Outcomes:

- Utilize knowledge from the physical and biological sciences as a basis for understanding the role of food,
  Nutrients, in food processing and preservation.
- Students will be able to deliver effective presentation of food safety, quality and hygiene to the general public.
- Students will gain ability to function as an individual as well as a member of team.
- Students will understand the impact of Food Science and Quality Control in society and Environmental context for sustainable development.
- Students will be able to carry out Nutritional evaluation of food products and shelf-life.
- Students will develop vertical progression to higher studies.
- Students will be promoted for start-up projects.

Program Specific Outcomes:

- Expose the participant to the basic essentials of Food Technology & preservation so that they become capable of independently handling food processing units.
- Students will be able to understand the nutritional side which may help to inculcate the scientific view regarding dietary habits of population.
- Enabling the participants to keep themselves abreast of recent changes in Food Technology and Management.
- Creating necessary awareness amongst students regarding the laws affecting Food Processing and Preservation.
- Inculcating entrepreneurship attitude and self-employment attitude in students.

Proposed scheme for Choice based Credit System with multiple enter multiple exit options B.Sc.Food Science & Quality Control

Structure of B.Sc. Program (Semester I & II)

SEMESTER–I (Duration–6 Months)

Sr. No.	Course (Subject) Title	TEACHING SCHEME						EXAMINATION SCHEME								
		THEORY			PRACTICAL			THEORY						PRACTICAL		
								Internal		University						
		Credits	No. of lectures	Hours	Credits	No. of lectures	Hours	Max	Min	Hours	Max	Total Marks	Min	Hours	Max	Min
1	DSC-A Food Chemistry-I	2	5	4	2	4	3.2	10	4	2	40	80	28	PRACTICAL EXAMINATION IS ANNUAL		
2	DSC-A Food Microbiology -II	2						10	4	2	40					
3	DSC-A Botany-I	2	5	4	2	4	3.2	10	4	2	40	80	28			
4	DSC-A Botany-II	2						10	4	2	40					
5	DSC-A Zoology-I	2	5	4	2	4	3.2	10	4	2	40	80	28			
6	DSC-A Zoology-II	2						10	4	2	40					
7	DSC-A Chemistry -I	2	5	4	2	4	3.2	10	4	2	40	80	28			
8	DSC-A Chemistry -II	2						10	4	2	40					
9	AECC-A English	4	4	3.2	-----	-----	-----	10	4	2	40	50	18			
10	SEC-I (VBC-I) Compulsory	2	Election, Democracy & Good Governance(On-line & Self-Study Mode)					-----	-----	1	50	50	18			
Total		**22**	**24**	**19.2**	**8**	**16**	**12.8**			-		**500**				

SEMESTER–II (Duration–6 Months)

Sr. No.	Course (Subject) Title	TEACHING SCHEME						EXAMINATION SCHEME								
		THEORY			PRACTICAL			THEORY						PRACTICAL		
								Internal		University						
		Credits	No. of lectures	Hours	Credits	No. of lectures	Hours	Max Marks	Min Marks	Hours	Max Marks	Total Marks	Min Marks	Hours	Max Marks	Min Marks
1	DSC-B Food Chemistry-II	2	5	4	2	4	3.2	10	4	2	40	80	28	As per BOS Guide lines	50	18
2	DSC-B Food Microbiology-II	2						10	4	2	40					
3	DSC-B Botany-III	2	5	4	2	4	3.2	10	4	2	40	80	28		50	18
4	DSC-B Botany-IV	2						10	4	2	40					
5	DSC-B Zoology-III	2	5	4	2	4	3.2	10	4	2	40	80	28		50	18
6	DSC-B Zoology-IV	2						10	4	2	40					
7	DSC-B Chemistry -III	2	5	4	2	4	3.2	10	4	2	40	80	28		50	18
8	DSC-B Chemistry -IV	2						10	4	2	40					
9	AECC-B English	4	4	3.2	-----	-----	-----	10	4	2	40	50	18		200	---
10	SEC-II (VBC-II) Compulsory	2	Constitution of India & Local Self Government(On-line & Self-Study Mode)					---	---	1	50	50	18			
Total		22	24	19.2	8	16	12.8			-		500				
Grand Total		44	48	38.4	16	32	25.6					1000				

- **Student contact hours per week: 32 Hours (Min.)**
- **Total Marks for B.Sc.-I (Including English):1200**
- Theory and Practical Lectures :48 Minutes Each
- Total Credits for B.Sc.-I (Semester I & II): **60**
- **DSC**–Discipline Specific Core course: Select any 4 subject pairs from A1 to A38 and B1 to B38.
- **AECC**–Ability Enhancement Compulsory Course (A & B)-English
- Practical Examination will be conducted annually for 50 Marks per course (subject).
- ***There shall be separate passing for internal and University theory and also for practical examinations.***

- ***Except English & SEC, there shall be combined passing for two theory papers of 40 marks each, .and minimum 28 marks required for passing out of 80.***
- ***SEC: Skill Enhancement Courses includes Skill Based Courses and Value Based Courses.***
- ***In case of VBC-I & II there shall be 25 Multiple Choice Questions (MCQ) of 2 marks each and minimum 18 marks are recruited for passing.***

Structure of B.Sc. Program (Semester III & IV)

SEMESTER–III (Duration–6 Months)																		
Sr. No.	Course (Subject) Title	TEACHING SCHEME						EXAMINATION SCHEME										
		THEORY			PRACTICAL			THEORY						PRACTICAL				
								Internal		University								
		Credits	No. of lectures	Hours	Credits	No. of lectures	Hours	Max Marks	Min Marks	Hours	Max Marks	Total Marks	Min Marks	Hours	Max Marks	Min Marks		
1	DSC- C/ Food Preservation- V	2	3	2.4	4	8	6.4	10	4	2	40	80	28	PRACTICAL EXAMINATION IS ANNUAL				
2	DSC-C / Fruit & Vegetable Processing - VI	2	3	2.4				10	4	2	40							
3	DSC-C Botany-V	2	3	2.4	4	8	6.4	10	4	2	40	80	28					
4	DSC-C Botany-VI	2	3	2.4				10	4	2	40							
5	DSC-C Zoology- V	2	3	2.4	4	8	6.4	10	4	2	40	80	28					
6	DSC-C Zoology-VI	2	3	2.4				10	4	2	40							
7	AECC-C	4	4	3.2	---	---	---	---	---	---	---	---	---					
8	SEC-III	Any one from pool of courses			2	---	---	---	---	---	---	---	---	2	50	18		
	TOTAL	16	22	17.6	14	24	19.2	60			240	350	---		50			

SEMESTER–IV(Duration–6Months)

Sr. No.	Course (Subject) Title	TEACHING SCHEME						EXAMINATION SCHEME									
		THEORY			PRACTICAL			THEORY						PRACTICAL			
								Internal		University							
		Credits	No. of lectures	Hours	Credits	No. of lectures	Hours	Max Marks	Min Marks	Hours	Max Marks	Total Marks	Min Marks	Hours	Max Marks	Min Marks
1	DSC-D Quality Control of food Product VII	**2**	3	2.4	4	6.4	8	10	4	2	40	**80**	**28**	**As per BOS Guide-lines**	**100**	**35**
2	DSC-D Cereals & Pulses VIII	**2**	3	2.4				10	4	2	40					
3	DSC-D Botany-VII	**2**	3	2.4	4	6.4	8	10	4	2	40	**80**	**28**		**100**	**35**
4	DSC-D Botany-VIII	**2**	3	2.4				10	4	2	40					
5	DSC-D Zoology-VII	**2**	3	2.4	4	6.4	8	10	4	2	40	**80**	**28**		**100**	**35**
6	DSC-D Zoology-VIII	**2**	3	2.4				10	4	2	40					
7	AECC-C AECC-D Environmental Studies	---	---	---	---	---	---	---	---	3 Project	70 30	**100**	**25** **10**		---	---
8	SEC-IV	Any one from pool of courses			2	---	---							2	**50**	18
	TOTAL	**12** **28**	**18** **40**	**14.4** **32**	**14** **28**	**19.2** **38.4**	**24** **48**					**400** **750**	--- --	----	**350**	

- Student contact hours per week: 36.8 Hours (Min.)
- Total Marks for B.Sc.-II (Including EVS) **1100**
- Theory and Practical Lectures :48 Minutes Each
- Total Credits for B.Sc.-II (Semester III & IV): **56**
- **DSC: -**Discipline Specific Core Course: Select any 3subject pairs, relevant to those opted at B. Sc. I, from DSC C1 to DSC C38 and / or DSC IC39 to DSC IC50 and DSC D1 to DSC D38 and/or DSC ID39 to DSC ID50.
- **AECC**- Ability Enhancement Compulsory Course (C): Environmental Studies: EVS Theory and AECC-D EVS Project (Theory:70 & Project:30 marks)

- ***There shall be separate passing for internal and University theory as well as practical / project examinations.***
- ***Practical Examination shall be conducted annually for 100 Marks per course (subject) and minimum 35 marks are required for passing.***
- ***Except Environmental Studies, there shall be combined passing for two theory papers of 40 marks each. i. e. minimum. 28 marks are required for passing out of 80.***
- ***Minimum 4 marks are required for passing out of 10 for Internal Examination of each paper.***
- ***Examination of SEC shall be either theory or practical depending upon type of SEC.***

Structure of B.Sc. Program Sem V&VI

SEMESTER–V (Duration–6Months)																	
Sr. No.	Subject Title	TEACHING SCHEME						EXAMINATION SCHEME									
		THEORY			PRACTICAL			THEORY					PRACTICAL				
								Internal		University							
		Credits	No. of lectures	Hours	Credits	No. of lectures	Hours	Max Marks	Min Marks	Hours	Max Marks	Min Marks	Hours	Max Marks	Min Marks		
1	DSE-E Fermentation Technology - IX	**2**	3	2.4				10	4	2	40	**14**	**PRACTICAL EXAMINATION IS ANNUAL**				
2	DSE-E Dairy Technology-X	**2**	3	2.4	**8**	**20**	**16**	10	4	2	40	**14**					
3	DSE-E Bakery & Confectionery Technology -XI	**2**	3	2.4				10	4	2	40	**14**					
4	DSE-E Food Quality control& Waste Management - XII	**2**	3	2.4				10	4	2	40	**14**					
5	AECC-E English III	**4**	4	3.2				10	4	2	40	**14**					
6	SEC-V	Any one from pool of courses			**2**	---	---	---	---				**2**	**50**	**18**		
	TOTAL	**12**	**16**	**12.8**	**10**	**20**	**16**	**50**			**200**						

SEMESTER–VI (Duration–6Months)																	
Sr. No.	Subject Title	TEACHING SCHEME						EXAMINATION SCHEME									
		THEORY			PRACTICAL			THEORY						PRACTICAL			
								Internal		University							
		Credits	No. of lectures	Hours	Credits	No. of lectures	Hours	Max Marks	Min Marks	Hours	Max Marks	Min Marks		Hours	Max Marks	Min Marks	
1	DSE-F Food Biotechnology XIII	2	3	2.4	8	20	16	10	4	2	40	14		PRACTICAL EXAMINATION IS ANNUAL			
2	DSE-F Meat,fish&Poultry Product Technology XIV	2	3	2.4				10	4	2	40	14					
3	DSE-F Food Hyginen & Sanitation - XV	2	3	2.4				10	4	2	40	14					
4	DSE-F Food Packaging XVI	2	3	2.4				10	4	2	40	14					
5	AECC-E English IV	4	4	3.2				10	4	2	40	14					
6	SEC-V	Any one from pool of courses			2	---	---	---	---					2	50	18	
	TOTAL	12	16	12.8	10	20	16	50			200						
	GRAND TOTAL	24	32	25.6	20	40	32			400	800						

- Student contact hours per week: 28.8 Hours (Min)
- Total Marks for B.Sc.-III (Including English): 800
- Theory and Practical Lectures: 48 Min. Each
- Total Credits for B.Sc.-III (Semester V&VI): 44
- **DSE-Discipline Specific Elective.** A candidate shall select one course (subject) from the three Courses (Subjects)selected at B.Sc.–II. Select any 4 pairsof papers from DSE-E1 to DSE-E84 for Sem –V and DSE- F1 to DSE-F84 for Sem-VI
- **AECC**-Ability Enhancement Compulsory Course (E & F): English for communication
- ***There shall be separatee passing for internal, theory and practical examinations.***

• ***Practical Examination shall be conducted annually for 200 marks, and minimum 70 marks are required for passing.***
• ***University semester end exam shall be of 40 marks per paper and minimum 14 marks are required for passing.***
• ***Minimum 4 marks are required for passing out of 10 for Internal Examination of each paper.*** • ***Examination of SEC shall be either theory or practical depending upon type of SEC.***

Semester V

(DSC-E) Fermentation Technology-IX, Credit – 2

Unit - 1 - Basic of Fermentation **(8)**

1.1 Introduction to Fermentation

1.2 Basic Structure of Fermentation

1.3 Fermentation media – a) Constituents b) Design of fermentation

1.4 Types of Fermentation process – Batch, Continuous & Dual

1.5 Factors affecting Fermentation process

1.6 Control of contamination in Fermentation

Unit – 2 – Beneficial aspects for Fermentation **(8)**

2.1Benefits of Fermentation

2.2Microorganism involved in Fermentation

2.3Microbial activities with specific role in Fermentation

2.4Significance of Fermentation food in Indian diet

2.5 Factors influence growth & Metabolic activities of microbes in food Fermentati

2.6Purity & Nature of food Fermentation

Unit – 3 – Fermented Foods **(8)**

3.1 Fermented Milk – Curd , Yoghurt, Buttermilk

3.2 Fermented Cereals – Idli, Dhokla, Bread, Saysause, Miso ,Tempeh

3.3 Fermented Beverages- Wine, Beer, Sake, Distilled Liquors

3.4 Fermented Vegetables – Sauerkrout, Pickles, Green Olives

3.5 Fermentation of Cocca, Tea, Coffee

3.6 Fermentation of Acetic acid, Vit B12 & Glutamic acid

Unit – 4 – Down Stream processing **(**

4.1 Introduction to downstream processes

4.2 Criteria of selection of recovery process

4.3 Removal of Microbial cells – a) Foam Separation b) Precipitation c)Filtration &

4.4 Cell Distruption – a) Physicomechanicalb) Chemical method

4.5 Extraction & Drying

Recommended Books :-

1. Biotechnology – Food Fermentation - Dr. S. K. Singh
2. Industrial Biotechnology - M. S. Rangannath & Shriram Shridhi
3. Food Microbiology - William Frazier, Dannise Westhoff
4. Food Biotechnology –S.N. Tripathy

(DSC-E) Dairy Technology – X, Credit 2

Unit - 1 - Introduction of Dairy Technology (6)

1.1 Development of milk processing industry in India present status & scope.

1.2 Dairy layout for small scale, Dairy design & sanitation layout

1.3 Dairy equipments & sanitation

Unit - 2 – Introduction of milk & primary processes (8)

2.1 Food value & Composition of milk.

2.2 Factors affecting Composition of milk.

2.3 Buying, receiving, collection, Transportation of milk, storage &distribution Of Milk

2.4 Processing of milk, filtration, clarification, cream separation & heattreatment of milk

Unit – 3 – Different Milk products (8)

3.1 Milk product Processing – cream, Butter, Khoa , Paneer, Ice-cream, condensed milk & evaporated milk

3.2 Judging & grading of milk & its products

3.3 Manufacturing of Cheddar cheese – Introduction, Manufacturing process, packaging, storage, defects and their prevention

3.4Dried milk products – Buttermilk powder, Whey Powder, IceCream mix

Unit – 4 – Byproducts Utilization (8)

4.1 Introduction

4.2 Classification & Composition of byproduct

4.3 Principles & methods of Utilization – Whey utilization & whey basedBeverages like lassi & buttermilk.

Recommend Books

1. outline of Dairy technology by Sukumar De
2. Yarpar, WJ & Hall, C. W. 1975 Dairy technology & Engineering AVI Westport
3. Warner J. M, 1976 Principles of Dairy Processing
4. Rosenthal, 1.1991.Milk &milk products. VCH, Newyork

(DSE-E) Bakery & Confectionery Technology-XI, Credit-2

Unit – 1 – Introduction of Bakery raw material **(8)**

1.1 Essential & optional ingredients

1.2 Role of ingredient

1.3 Baking principle - Caramelisation, Mallard browning

1.4 Introduction of bakery products &equipments

1.5 Effect of baking conditions

Unit – 2 – processing of bakery Products **(8)**

2.1 Cake: Types, formulation & process, Principle of cake characters of cake

2.2 Bread: Formulation & process, principle of cake preparation,

2.3 Biscuits & cookies: Definition, difference, between biscuits & cookies, types of cookies & biscuits, Cracker & general defects

Unit – III – Confectionary products **(8)**

3.1 Introduction to Confectionary

3.2 Ingredients

3.3 Sugar boiled Confectionary – a) Crystalline b) Amorphous

3.4 Indian Confectionary

Unit – IV – Processing Confectionary products **(6)**

4.1 Chocolate processing – Introduction, Types, methods of manufacture, its use, storage & General defects.

4.2 Hardboiled candy – Raw materials, method, defects & storage

4.3 Chewingum – Raw material, method, packaging

4.4 Indian Confectionary - Burfi, Pedha preparation

Recommended Books -

1. Technology of Confectionary, Chocolate, Toffee, Candy, Chewing gum, Lollipop, Jelly Production
2. Food production operation - Ravindra Bali
3. International Cuisine and Food Production management – Parvindarbali
4. Bakery Science & Cereal technology -Neelam khetorpaul, Raj Grewal Sudesh wood
5. The Complete technique book on bakery production by Niir Board

(DSE-E) Food Quality Control & Waste Management-XII, Credit-2

Unit – I – Introduction of Quality Control **(6)**

1.1 Definition and importance of Quality control
1.2 Principles of Quality Control
1.3 Quality attributes of Food – Nutritional quality, Microbial, Sensory
1.4 Sample & Sampling Method of Quality Evaluation
1.5 Quality assurance in Food Services System

Unit – II – Sampling & analysis of Foods **(8)**

2.1 Sampling – Objectives, Guidelines, Methods
2.2 Hazards – Microbial, Physical, Chemical
2.3 Analysis of Food – Chemical: Moisture, Fat, Protein, Crude fiber
Microbial: DMC, Coli form determination
2.4 Ensuring safe Food

Unit – III – Food Standard laws and safety management **(8)**

3.1 Food laws – HACCP, CCP, Codex, alimentarus Commission
3.2 ISO/22000: Food Safety managements system
3.3 Food Quality Management: Quality Management Principles

Unit – IV – Waste Management and Effluent treatment of Food industry **(8)**

4.1 Introduction to Waste Management
4.2 Waste disposal – Types of Waste
4.3 Method of Waste disposal – Land filling, anaerobic, recycling digestion
Measurement of BOD & COD
4.4 Effluent treatment: Disposal in Sea, river, spray, Irrigation, land filling
Treatment, Trickling filers, Biological aerated filter, fluidized bed system,
Activated sludge process, aerobic & anaerobic digestion
4.5 Safe disposal of waste

Recommended Books:-

1. An introduction to Food Science and Technology & Quality management
2. Devendra Bhatt & Priyanka Tomar
3. Food Quality Management - Manoranjan Kalia
4. Hand book of analysis &Quality Control - Rannanganna

Semester VI

(DSE-F) Food Biotechnology –XIII, Credit – 2

Unit – 1 Biotechnology – Scope & Importance **(8)**

1.1 Definition

1.2 Traditional & Modern biotechnology

1.3 Biotechnology of India & Global trends

1.4 Prevention of misuse of biotechnology

1.5 Potential of biotechnology

Unit – 2 Tools of genetic engineering **(8)**

2.1 Basic requirement

2.2 Cutting & Joining of DNA

2.3 Cloning vectors

2.4 Techniques of genetic engineering, cloning methods & DNA analysis

2.5 Genetically modified foods

Unit – 3 Single cell protein & mushroom cultivation **(8)**

3.1 Microorganisms used in SCP.

3.2 Substrates used nutritional value cultivation & uses

3.3 Historical Background & present status of Mushroom cultivation

Unit – 4 Enzyme Biotechnology **(6)**

4.1 Definition & Properties of enzymes

4.2 Factors affecting activation & inhibition of enzymes

4.3 Isolation of enzymes producing microorganisms, strain development Formulation & inoculums preparation

4.4 Purification of enzymes & their immobilization – Different type, Advantages & Disadvantages

4.5 Industrial production of protease, amylase & cellulose

Recommended Books

1. Knorr, D, 1982. Food biotechnology, Masel Dekker
2. Joshi V. K. & Pandey, A. Ed 1999 Biotechnology, Food Fermentation
3. Crueger, W& Crueger A 1984 Biotechnology - A Text book of Industrial Microbiology
4. Banis W. 1993 Biotechnology from A to Z Oxford Univer.

(DSE - F)Meat, Fish & Poultry Products Technology – XIV, Cedit-2

Unit – 1– Importance of meat products **(8)**

1.1 Introduction & Importance of meat products in India
1.2 Chemical Composition & microscopic structure of meat
1.3 Pre-slaughter inspection of animal
1.4 Transportation, feeding of animal before slaughtering

Unit – 2 – Stunning & slaughter operations **(8)**

2.1 Slaughtering of animal
2.2 Bones & cuts of Carcass
2.3 Quality and grading of meat
2.4 Post Mortem inspections
2.5 Meat tenderization, aging curing & rigor mortis, preservation of meat & Poultry products
2.6 Meat plant sanitation & safety

Unit –3 – Egg & Egg products **(8)**

3.1 Structure, composition, Nutritive value & functional properties of egg
3.2 Processing of Egg
3.3 Quality of egg & Egg Products
3.4 Effects of heat on egg proteins

Unit – 4- Seafood **(6)**

4.1 Classification of Seafood
4.2 Types of fish
4.3 Composition and structure of Fish
4.4 Postmortem changes in Fish
4.5 Canning, smoking freezing & dehydration of fish

Recommended Books –

1. Technology of Meat Fish & Poultry products
2. Lawrie, R. A. 1975 meat science 2nd ed
3. Lavie. a. 1980 Meat handbook 4th edition AVI west port
4. Portsmouth J.I. 1979 Commercial Rabit meat production by Saiga Survey England
5. Stadelmen W.J Cotterill O.1977. egg Science &Technology

(DSE- F) Food Hygiene & Sanitation-XV, Credits-2

Unit – I – Contamination & Food Born Diseases (8)

1.1 Introduction of sources of contamination
1.2 Classification of food according to ease which it spoils
1.3 Conditions & signs of spoilage in fresh, dry & Preserved food
1.4 Mode of transmission of disease &food born illness
1.5 Bacterial & Viral food intoxications
1.6 Naturally occurring intoxications
1.7 Food allergies, control of food born illness

Unit – II – Personal Hygiene & safety (8)

2.1 Necessity for personal hygiene, health of staff
2.2 Personal appearance, sanitary practices habits protective clothing
Importance of rest and exercise
2.3 Safety at the work place

Unit – III – Sanitary procedures & pest control (8)

3.1 Importance of sanitary procedures in Food processing
3.2 Special Food Operations – Introduction, mobile food units, vending
Machines, street side foods and diseases
3.3 Cleaning procedures – Cleaning &sanitizing, their importance
3.4 Pest control – Importance, Classification of pest, effect of pesticides on pest & their
Methods of application, precaution to be taken while handling pesticides

Unit – IV – Food safety management (6)

4.6 Introduction
4.7 Good manufacturing practices
4.8 Good laboratory practices
4.9 HACCP
4.10 ISO-22000

Recommended book –

1. Food Hygiene & Sanitation - S. Roday
2. Hospitality industry handbook on Hygiene & safety – Lisa Gordomn – Davis
3. Principles of food sanitation – Norman G .Marriott & Gravani
4. Essentials of food sanitation – Norman G .Marriott

(DSE- F) Food Packaging Technology- XVI, Credit -2

Unit – 1 – Introduction of Packaging **(8)**

1.1 Introduction
1.2 Principles of packaging
1.3 Requirements of food packaging
1.4 Characteristics of Packaging materials
1.5 Basic Packaging material – paper, plastic, Polyethylene
Aluminum Foil, glass, metals, & edible films, others
1.6 Effect of Packaging on nutritive value of food

Unit – 2 –General packaging of food products **(8)**

2.1 Packaging of milk & milk product
2.2 Packaging of Fruits & Vegetables
2.3 Packaging of cereal & cereal products
2.4 Packaging of snack foods
2.5 Packaging of sugar & Confectionary

Unit – 3 – Modern Packaging system **(6)**

3.1 Machineries for Food Packaging
3.2 Controlled Atmosphere Packaging
3.3 Aseptic Packaging
3.4 Edible coating films

Unit – 4 – Packaging laws & regulation **(8)**

4.1 Introduction
4.2 SWMA
4.3 PFA Rules & AGMARK Rules
4.4 FPO Rules & MPO Rules

Recommended Books –

1. Modern packaging techniques by EIRI board
2. Hand book of Food packaging techniques by Eiri Board
3. Food processing & preservation by G. Subhulakshmi & Vdigir

List of Practical

1. Extraction of Chlorophyll
2. Extraction of Carotenoids
3. Estimation of free amino acids by Ninhydrin Method
4. Estimation of protein content of given food sample by MicroK Jaldhal method
5. Estimation of phenol content of given food sample
6. Estimation of crude fiber by Weendes methods
7. Estimation of pectin content of given food sample
8. Estimation of BOD of given sewage sample
9. Estimation of COD of given sewage sample
10. Estimation of inorganic phosphate by Fisk – Subbarao Methods
11. Determination of MPN (most probable Number) of given water sample
12. Estimation of some common food additives – Sulphur dioxide, Sodium benzoate colors
13. Analysis of wheat flour – alcoholic acidity, granularity of flour, crude gluten, total ash, pH Value
14. Analysis of Biscuits – Moisture, ash content, acidity of extracted fat
15. Analysis of tea and roasted coffee – moisture, ash, tannin Caffeine,
16. Methods of analysis for sugar boiled confectionary and chocolates moisture, reducing Sugar, Fat.
17. Isolation of salmonella sp from given Food sample
18. Isolation of halophilic bacteria from given Food sample
19. Isolation of mold from given food sample
20. Isolation of different microorganism from milk
21. Effect of physical and chemical agents on growth of bacteria – pH, temperature, Heavy metals Antibiotics
22. Microbial sampling of air from various source e. g. indoor, outdoor, industrial area
23. Analysis of water by Presumptive, Confirmed and completed test
24. Isolation of E. coli from food sample and identification by IMVIC test
25. Bacteriological analysis of milk – SPC a. DMC b. Reeducates test
26. Determination of efficiency of Pasteurization by Phosphates test
27. Classification of various packages based material and rigidity
28. Measurement of thickness of paper and paper board.
29. Measurement of water absorption of paper and paper board.
30. Determination of GSM
31. Determination WVTR of Film
32. Study of slaughtering methods of meat animals
33. Study of postmortem changes in meat
34. Preservation of meat by different methods
35. Quality evaluation of fish or prown
36. Evaluation of eggs for quality parameters
37. Preparation of fish products
38. Preparation of meat products

39. Preparation of egg products
40. Isolation of microorganisms from common food items- curd, bread, pickles and Spoiled foods
41. Effect of pH temp, substrate connection on amylase enzyme
42. Physico-chemical properties of grains
43. Determination of fat of milk by Gerber method
44. Determination of SNF by lactometer method
45. Preparation of Cakes
46. Preparation of Cookies
47. Preparations of biscuits
48. Preparation of Bread
49. Preparation of Sugar Boiled Candy
50. Preparation of chocolate
51. Preparation of Paneer
52. Preparation of Rusgulla
53. Preparation of Gulabjamun
54. Preparation of Ice- cream
55. Preparation of Shrikhand
56. Preparation of Khoa
57. Preparation of Banana chips
58. Preparation of Resins
59. Preparation of Toffee
60. Preparation of mango lather
61. Preparation of different Soups
62. Preparation of Fermented food
63. Preparation of Grape wine
64. Preparation of tofu
65. Preparation of Sauerkraut
66. Sensory analysis of different food samples.
67. Preparation of different RTS
68. Preparation of nectar
69. Preparation of cordial
70. Preparations of dried vegetables
71. Determination of physical properties of legumes/ oilseeds

72. Preparation of puffed legumes

73. Visit to slaughtering house

74. Visit to bakery and confectionery industry

75. Visit to rice milling industry

76. Visit to waste treatment plants at dairy and food industries

77. Visit to dairy

Nature of theory Examination and distribution of marks (SEM V and VI) (40 marks each Paper)

Q. 1 Multiple choice questions	08 Marks
Q. 2 Long answer questions Two out of Three (2x08)	16 Marks
Q. 3 Short notes Four out of six (4x4)	16 Marks
Total	40 Marks

Practical Examination of 200 Marks –

1. The practical examination will be conducted on three days for not less than five hours

On each day of practical examination

2. Each candidate must produce a certificate from the head of the department in his / her

College stating that he/ she has completed practical course in satisfactory manner on The down from time to time by A. C. on the recommendation of BOS and that laboratory Journal has been properly maintained

3. Candidates have to visit at least two places of interest (food industry/ Dairy/ Research Lab) Submit the report of their visit at the time of the examination. The report duly certified By Head of the department.

Distribution of marks for practical examination –
Questions Type Marks

Q. 1. Principle writing	**20 Marks**
Q. 2. Preparation of fermented	**30 Marks**
Q. 3. Preparation of non fermented Food	**30 Marks**
Q. 4. Chemical analysis of food sample	**30 Marks**
Q. 5. Microbial analysis of food sample	**30 Marks**
Q. 6. Oral	**10 Marks**
Q. 7. Journal	**20 Marks**
Q. 8. Tour report	**10 Marks**
Q. 9. Project	**20 Marks**
Total	**200**