SHIVAJI UNIVERSITY, KOLHAPUR.

****

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

Syllabus For

B.Sc. Part - I

Food Technology and Managemnt (Entire)

SEMESTER I AND II

(Syllabus to be implemented from June, 2019 onwards.)

B.Sc. Part - I

Food Technology and Management (Entire)

SEMESTER I AND II

(Syllabus to be implemented from June, 2019 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 technology and management to undergraduate students of B. Sc. Food technology and Management(Entire) Program.

  Students learn Food technology and Management as a separate course (subject) from B. Sc. I.

  The goal of the syllabus is to make the study of Food technology and Management popular, interesting and encouraging students for higher studies including research.

❖ Structure of Program and List of Courses are as follows:

(i)Structure of B. Sc. Food Technologyand Management (Entire)Programme Sem I & II

Structure – I

S E M E S T E R – I (Duration – 6 Months)																
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		
1	DSC-FTM-A1	**2**	5	4	**2**	4	**3.2**	2	50	**100**	**35**	**PRACTICAL EXAMINATION IS ANNUAL**				
2	DSC-FTM-A2	**2**						2	50							
3	DSC-FTM-A3	**2**	5	4	**2**	4	**3.2**	2	50	**100**	**35**					
4	DSC-FTM-A4	**2**						2	50							
5	DSC-FTM-A5	**2**	5	4	**2**	4	**3.2**	2	50	**100**	**35**					
6	DSC-FTMA6	**2**						2	50							
7	DSC-FTM-A7	**2**	5	4	**2**	4	**3.2**	2	50	**100**	**35**					
8	DSC-FTM-A8	**2**						2	50							
9	AECC-A	**2**	4	3.2	-----	-----	-----	2	50	**50**	**18**					
Total		**18**	**24**	**19.2**	**8**	**16**	**12.8**		-	**450**						
S E M E S T E R – II (Duration – 6 Months)																
1	DSC-FTM-B1	**2**	5	4	**2**	4	**3.2**	2	50	**100**	**35**	**As per BOS Guide-lines**			**50**	**18**
2	DSC-FTM-B2	**2**						2	50							
3	DSC-FTM-B3	**2**	5	4	**2**	4	**3.2**	2	50	**100**	**35**				**50**	**18**
4	DSC-FTM-B4	**2**						2	50							
5	DSC-FTM-B5	**2**	5	4	**2**	4	**3.2**	2	50	**100**	**35**				**50**	**18**
6	DSC-FTM-B6	**2**						2	50							
7	DSC-FTM-B7	**2**	5	4	**2**	4	**3.2**	2	50	**100**	**35**				**50**	**18**
8	DSC-FTM-B8	**2**						2	50							
9	AECC-B	**2**	4	3.2	-----	-----	-----	2	50	**50**	**18**					
Total		**18**	**24**	**19.2**	**8**	**16**	**12.8**		-	**450**					**200**	
Grand Total		36	**48**	**38.4**	**16**	**32**	**25.6**			**900**						

- Student contact hours per week : 32 Hours (Min.)
- Theory and Practical Lectures : 48 Minutes Each
- Total Marks for B.Sc.-I (Including English) : **1100**
- Total Credits for B.Sc.-I (Semester I & II) : **52**
- **DSC –** Discipline Specific Core course: All papers are compulsory.
- **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 theory and practical courses.***

(A) Non-Credit Self Study Course : Compulsory Civic Courses (CCC)
For Sem I: CCC – I : Democracy, Elections and Good Governance

(B) Non-Credit Self Study Course : Skill Development Courses (SDC)
For Sem II: SDC – I : Any one from following (i) to (v)
i) Business Communication & Presentation ii) Event management iii) Personality Development, iv) Yoga & Physical Management v) Resume, Report & proposal writing

ii) Structure of B. Sc. Food Technologyand Management(Entire) Programme Sem 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.)
- Total Marks for B.Sc.-II (Including EVS) : **1000**
- Theory and Practical Lectures : 48 Minutes Each
- 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.***

(iii) Structure of B. Sc. Food Technology and Management(Entire) Programme Sem V & 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
S E M E S T E R – 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**	---			
S E M E S T E R – 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) : 7**00**
- 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

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

i) B. Sc FTM. Part 1 (Sem I & II),

Course code	Name of Course	Course code	Name of Course
Sem I		**Sem II**	
DSC FTM-A1	Food Science-I	**DSC FTM-B1**	Food Chemistry – I
DSC FTM-A2	Food Science-II	**DSC FTM-B2**	Food Chemistry – II
DSC FTM-A3	Food Microbiology -I	**DSC FTM-B3**	Principles of Food Preservation –I
DSC FTM-A4	Food Microbiology -II	**DSC FTM-B4**	Principles of Food Preservation – II
DSC FTM-A5	Dairy Technology –I	**DSC FTM-B5**	Human Nutrition-I
DSC FTM-A6	Dairy Technology –II	**DSC FTM-B6**	Human Nutrition-II
DSC FTM-A7	Human Physiology-I	**DSC FTM-B7**	Computer Basics and Applications –I
DSC FTM-A8	Human Physiology-II	**DSC FTM-B8**	Computer Basics and Applications –II
AECC – A	English – I	**AECC – B**	English – II

Practical

DSC FTM-P1	Lab Course I (Based on DSC FTM-A3 & DSC FTM-A4)	**DSC FTM-P3**	Lab Course III (Based on DSC FTM-B5 & DSC FTM-B6)
DSC FTM-P2	Lab Course II (Based on DSC FTM-A5 & DSC FTM-A6)	**DSC FTM-P4**	Lab Course IV (Based on DSC FTM-B7 & DSC FTM-B8)

DSC FTM: - Discipline Specific Core Course Food technology and Management

AECC: - Ability Enhancement Compulsory Course: Compulsory English

ii) B.Sc. FTM Part 2 (Sem 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)		

iii) B. Sc. FTM Part 3 (Sem V & VI)

Discipline Specific Elective (DSE)

Course code	Name of Course	Course code	Name of Course
Sem V		**Sem VI**	
DSE FTM-E1	Animal Product Technology-I	**DSEFT M-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

Semester I
FOOD SCIENCE – Paper I
(DSC FTM-A1 – Food Science I)
Credits 2 (Marks 50) Hours 30, 37.5 Lectures of 48 minutes

Unit – I	Hours Alloted
Introduction to Food Science • Definition & Function of food • Basic food groups by ICMR • Classification of food • Cooking & Objectives of cooking • Methods of Cooking- Conduction, Convection & radiation • Microwave Cooking • Solar Cooking • Classification of Cooking method- Moist, Dry & Combination methods **Food Preparation** • Definition • Preliminary Treatments • Cleaning-wet and dry • Sorting and grading- Shape, size and colour • Peeling- Flash, steam, knife, abrasion, caustic and flame peeling. **Cereals** • Introduction & Definition • Structure • Composition and Nutritive Value • Important Cereals • Storage of cereals • Role of cereals in cookery .	**15**
Unit – II	
Pulses • Introduction & Definition • Structure • Composition and Nutritive Value • Important Pulses • Processing of pulses • Pulse cookery • Factors affecting cooking quality • Role of pulses in cookery **Nuts**	

• Introduction • Classification of nuts • Specific nuts- Cashew-nut, Coconut, groundnut, almonds, Chestnut • Toxins in nuts • Role of nuts in cookery **Oils and Fats** • Introduction • Nutritional importance • Sources • Functions • Animal fats & plant fats • Role of fats and oils in cookery • Changes in fats during storage • Prevention of fat spoilage	**15**

References

1. Food Facts & Principles – N. ShakuntalaManay, M. Shadaksharswamy
2. Food Science –B. Srilakshmi
3. Food Science - by Potter
4. Food Science- Sumati R. Mudambi
5. Food Facts and Principles By ShakuntalaManay
6. Food Processing and Preservation By G. Subbulakshmi, Shobha A Udipi
7. Food Processing Technology By P.J.Fellows

Semester I
FOOD SCIENCE – Paper II
(DSC FTM-A2 – Food Science II)
Credits 2 (Marks 50) Hours 30, 37.5 Lectures of 48 minutes

Unit – I	Hours Alloted
Fruits • Introduction • Classification • Composition and Nutritive value • Ripening of fruits • Fruit Storage • Storage of fruits **Vegetables** • Introduction • Classification • Composition and Nutritive value • Selection of fruits • Salads • Storage of vegetables • Vegetables and fruits as functional foods. **Spices** • Introduction • Classification • Composition • Major Spices & Minor spices Flavoring extracts • Adulteration of spices	**15**
Unit – II	
Sugar and Related products • Nutritive value • Properties • Sugar related products • Sugar cookery • Artificial sweeteners **Effect of Processing** • Effect of processing on Physical properties of food	**15**

• Effect of processing on sensory properties of food • Effect of processing on nutritional properties of food **Food Adulteration** • Definition • Types of Adulterants • Methods to detect adulteration	

References

1. Food Facts & Principles – N. ShakuntalaManay, M. Shadaksharswamy
2. Food Science –B. Srilakshmi
3. Food Science - Potter
4. Food Science- Sumati R. Mudambi
5. Food Facts and Principles - ShakuntalaManay
6. Food Processing and Preservation - G. Subbulakshmi, Shobha A Udipi
7. Food Processing Technology - P.J.Fellows

Semester I

Food Microbiology – Paper I

(DSC FTM-A3 – Food Microbiology I)

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

Unit – I	Hours Alloted
Introduction to Microbiology • Definition of Microbiology • Important contributions of various scientists • Classification of microorganisms • Morphology of bacteria: Size, Shape and Arrangements • Cytology of bacteria- structure of typical bacterial cell, structure and functions of: cell wall • Nutritional requirements-Nutrition, temperature, moisture content, oxygen, osmotic pressure, hydrogen ion concentration and light • Growth and Growth curve of bacteria. **Techniques in microbiology** • Sterilization-Physical methods- Temperature, Filtration, UV radiation and Osmotic pressure • Chemical methods- Use of chemical agents for sterilization • Definition of Media, Components of Media • Types of media: Natural, Synthetic, Semi-synthetic, Special, Selective and Differential media • Cultural methods- Isolation techniques: Streak plate, pour plate and Spread plate.	**15**
Unit II	
Stains and Staining Procedures of Bacteria • Definition of dye and stains, classification of stains- Acidic, Basic and Neutral • Staining procedures: Principles and Procedure • Mechanism and applications of- Simple staining, Differential staining- Gram staining and Acid fast staining. • Mechanism and applications of Negative staining, Special staining **Recombinant DNA Technology** • Introduction • Definition of Recombinant DNA Technology/ Genetic Engineering • Enzymes used in Recombinant Technology	**15**

• Steps in Gene Cloning • Vectors used in Recombinant Technology • Genetically Modified Foods • Advantages & Disadvantages of GM Foods	

REFERENCES

1. Microbiology by Dr M G Bodhankar, MrsTriptiBapat&MrsNivedita Joshi, PhadkePrakashan
2. Food microbiology by William Frazier
3. Textbook of Microbiology (6^{th} edition) by Ananthnarayan& C K J Paniker
4. Basic Food Microbiology by George J. Banwart
5. Food Microbiology by M R Adams and M O Mos
6. Industrial microbiology L.E.Casida
7. Fundamental Food Microbiology- Bibek Ray &ArunBhunia
8. Biotechnology: Food Fermentation- Microbiology, Biochemistry and Technology- V.K. Joshi & A. Pandey- Volume 1 & 2
9. Modern Food Microbiology – K. R. Aneja

Semester I

Food Microbiology – Paper II

(DSC FTM-A4 – Food Microbiology II)

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

Unit I	
Microbiology and Spoilage of food • Factors influencing food spoilage – Intrinsic & Extrinsic factors • Contamination and spoilage of fruits and vegetables • Contamination and Spoilage of cereal- cereal products • Contamination and Spoilage of meat, fish, poultry • Contamination and Spoilage of milk- milk products **Microbiology of water** • Bacterial flora of water • Indicators of faecal pollution and their advantages • Bacteriological determination of water- Standard plate count, Total plate count • Qualitative test- Standard multiple tube fermentation & IMVIC test • Quantitative test- Most probable number test.	**15**
Unit II	
Food-Borne illness : Bacterial and Non-bacterial • Food Borne Intoxications – Staphylococcal poisoning, Botulism • Food Borne Infections – Salmonellosis, Shigellosis • Food Borne Toxic Infections – Cholera, Listeriosis • Mycotoxins – Aflatoxin, Patulin, Ochratoxin • Food – Borne Parasites – Trichinosis • Seafood Toxicants – Shellfish Poisoning, Scombroid Food Poisoning **FoodFermentations** • Role of micro-organisms in fermentation • Fermented Meat & Fish Products – Sausages, Fermented Fish • Fermented Fruit & Vegetable Products – Sauerkraut, Kimchi, Vinegar, Citric acid • Fermented Cereal Products – Idli, Vada, Dosa, Bhatura, Dhokla, Miso, Tempeh, Soy Sauce • Economically important fermented foods- Beer, Ale, Wine, Distilled Liquor Products	15

REFERENCES

1. Dey S. 1994. Outlines of Dairy Technology. Oxford Univ. Press. New Delhi.
2. Robinson R. K. (2 vol. set). 1986. Modern Dairy Technology. Elsevier Applied Science UK.
3. Warner J. M. 1976. Principles of Dairy Processing. Wiley Eastern Ltd. New Delhi.
4. Yarpar W. J. and Hall C. W. 1975. Dairy Technology and Engineering. AVI Westport.
5. Rosenmal I. 1991. Milk and Milk Products. VCH. New York.

Semester I

Dairy Technology – Paper I

DSC FTM-A5 – Dairy Technology I

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

Unit – I	Hours Alloted
Market Milk • Introduction & Definition • Chemical composition & Nutritive value • Factors affecting chemical composition of Milk • Physico-chemical properties of Milk • Buying and collection of Milk • Cooling and transportation of Milk • Manufacture, Packaging and Storage of Pasteurized Milk • Judging and Grading of Milk • Flavor defects in Milk, their causes and prevention • Uses of Milk • Microbiology of Milk • Hygiene & Sanitation of Dairy Equipments • Present Scenario of Dairy Industries in India **Special Milks** • Introduction • Types of special milks- Definition, Standards, Processing & Uses • Sterilized Milk • Homogenized Milk • Flavored Milk • Fermented Milks- Natural Butter Milk, Cultured Butter Milk, Acidophilus Milk, Bulgarian Butter Milk, Kefir, Kumis & Yoghurt • Standardized Milk • Reconstituted/Rehydrated Milk • Recombined Milk • Toned Milk & Double Toned Milk • Vitaminized/Irradiated Milk • Soft-curd Milk	**15**
Unit II	
Dried Milks • Definition & Standards • Classification	

• Chemical Composition • Food and Nutritive value • Milk Drying systems- Drum Drying & Spray Drying • Manufacturing of Whole Milk Powder & Skimmed Milk Powder • Packaging & Storage • Judging and Grading • Defects- causes and prevention • Uses **Condensed and Evaporated Milks** • Introduction • Definition & Classification • Chemical composition and Standards • Food and Nutritive Value • Physico-chemical properties • Manufacture, Packaging, Storage and Distribution • Judging and Grading • Defects- their causes and prevention • Uses	**15**

REFERENCES

1. DeySukumar - Outlines of Dairy Technology. Oxford Univ. Press. New Delhi.
2. Robinson R. K- Modern Dairy Technology. Elsevier Applied Science UK.
3. Warner J. M. - Principles of Dairy Processing. Wiley Eastern Ltd. New Delhi.
4. Yarpar W. J. and Hall C. W. - Dairy Technology and Engineering. AVI Westport.
5. Rosenmal I. - Milk and Milk Products. VCH. New York.

Semester I

Dairy Technology – Paper II

DSC FTM-A6 – Dairy Technology II

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

Unit I	Hours Alloted
Fat Rich Dairy Products • Definition & Standards • Classification & Chemical composition • Food and Nutritive Value • Physico-chemical properties • Manufacture, Packaging, Storage and Distribution • Judging and Grading • Defects- their causes and prevention • Uses of Fat Rich Dairy Products • Neutralization of Cream- Definition, Objectives & Procedure • Products- Cream, Butter and Butter Oil **Indian Dairy Products** • Introduction • Definition & Standards • Chemical composition • Nutritive Value • Manufacturing, Packaging & Storage • Uses • Products- Kheer, Khoa, Rabri, Kulfi, Dahi, Shrikhand, Paneer, Channa, Ghee &Lassi	**15**
Unit II	
Cheese • History • Definition & Standards • Classification • Chemical composition • Food and Nutritive value • Types & Classification • Manufacturing of Cheddar Cheese, • Packaging and Storage • Judging and Grading • Defects- causes and prevention	

• Uses **Ice-cream** • Introduction • Definition & Standards • Classification • Chemical Composition • Food and Nutritive value • Role of constituents • Manufacturing, packaging and storage • Judging and Grading • Overrun • Defects- causes and prevention • Uses	**15**

REFERENCES

1. De Sukumar - Outlines of Dairy Technology. Oxford Univ. Press. New Delhi.
2. Robinson R. K. - Modern Dairy Technology. Elsevier Applied Science UK.
3. Warner J. M. - Principles of Dairy Processing. Wiley Eastern Ltd. New Delhi.
4. Yarpar W. J. and Hall C. W. - Dairy Technology and Engineering. AVI Westport.
5. Rosenmal I. - Milk and Milk Products. VCH. New York.

Semester I

Human Physiology – Paper I

DSC FTM-A7 – Human Physiology I

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

Unit I	Hours Alloted
Cells, Tissues and Organization of body • Structures and functions of cell and cell organelles • Types of Tissues • different systems of body • Axial Skeleton • Appendicular Skeleton • Cavities of the body **Blood** • Composition and functions of Blood • Structure and functions of RBC,WBCand Platelets • ABO and Rh Blood group system • Blood grouping and Significance • Haemostasis	**15**
Unit II	
Respiratory System • Organs of respiratory system and their functions • Mechanism of respiration • External respiration • Internal respiration • Lung Volumes and capacities **Cardiovascular system** • Structure and functions of Heart • Tppes of blood circulation • Cardiac cycle • Heart Rate, • Cardiac output • Stroke volume • Blood Pressure-Definition,Types • Methods of determination • Factors affecting Blood pressure	**15**

REFERENCES

1. C.C.Chatterjee's Human physiology 12th edition vol I/ II
2. Textbook of Medical physiology -A.C. Guygton
3. Concise medical physiology – SujitChoudhari
4. Basic clinical physiology- J.H. Green
5. Ross & Wilson's Anatomy & Physiology in Health & illness 12th Anne Waugh& Allison Grant
6. Physiology –Vijaya Joshi
7. Basics of medical physiology 4th edition D.Venkatesh and H.H Sudhakar

Semester I

Human Physiology – Paper II

DSC FTM-A8 – Human Physiology II

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

Unit – I	**Hours Alloted**
Digestive System • Introduction • Parts of Digestive system- • Mouth-Tongue,Teeth and Salivary Glands ,Pharynx and oesophagus • Stomach-Structure and Functions • Small Intestine –Structure and Functions • Large Intestine –Structure and Functions • Liver and Pancreas -Structure and functions • Absorption of digested food **Urinary System** • Introduction • Parts of Urinary system and their functions • Formation of urine • Physical examination of urine • Normal constituents of urine • Abnormal constituents of urine • Microscopic examination of urine	**15**
Unit II	
Nervous System • Structure and functions of brain and Spinal cord • Peripheral Nervous system • Somatic and Autonomous system • Reflex action • Neurotransmitters **Lymphatic system** • Formation of lymph • composition of lymph • Parts of lymphatic system and their functions	**15**

References:

1. C.C.Chatterjee's Human physiology 12th edition vol I/ II
2. Textbook of Medical physiology -A.C. Guygton
3. Concise medical physiology – SujitChoudhari
4. Basic clinical physiology- J.H. Green
5. Ross & Wilson's Anatomy & Physiology in Health & illness 12th Anne Waugh& Allison Grant
6. Physiology –Vijaya Joshi
7. Basics of medical physiology 4th edition D.Venkatesh and H.H Sudhakar

Semester II

Food Chemistry – Paper I

DSC FTM-B1 – Food Chemistry I

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

Unit – I	Hours Alloted
Water • Forms of water in food, Role of water in food • Water Activity and relative vapour pressure, Water activity and storage of food, Water activity and packaging of food, Water activity and processing of food **Carbohydrates** • Definition, sources, classification - monosaccharides, oligosaccharides, polysaccharides • Physical, Chemical and structural properties of monosaccharides • Dietary fibres, Non-starch polysaccharides- Cellulose, CMC, Hemicellulose, Pectin, Hydrocolloids and classification of hydrocolloids • Sources and effect of processing on carbohydrates	**15**
Unit II	
Lipids • Definition, sources, Classifications of fatty acids • Physical and chemical properties of fatty acids • Classification of lipids • Reactions of lipids in food- Flavour reversion, Enzymatic hydrolysis, Peroxidation of unsaturated lipids, Heating of fat and oil, Radiolysis, Microbial degradation • Quality tests for oil/fats • Emulsions, Fat replacers, Novel fats and oils **Vitamins** • Definition, fat soluble vitamins-Vitamin A, D, E and K,	**15**

• Water soluble vitamins – B Complex Vitamins and Vitamin C • Sources, deficiency, excess, RDA and effect of food processing on vitamins	

REFERENCES

1. Food chemistry- H. D. Belitz, W. Grosch, P. Schieberle
2. Food science - By Potter
3. Food Facts and Principles – N. ShakuntalaManay, M. Shadaksharswamy
4. Food chemistry I- Fennama O. R.
5. Principles of food Chemistry- John M. DeMan
6. Biochemistry – Dr. U. Satyanarayan
7. Textbook of Biochemistry – Albert Lehninger
8. Food Science – Sumati R. Mudambi, Shalini M. Rao, M.V.Rajagopal

Semester II

Food Chemistry – Paper II

DSC FTM-B2 – Food Chemistry II

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

Unit I	
Proteins • Definitions of proteins and amino acids, sources • Classification of amino acids, Physical and chemical properties of amino acids**,** Peptides • Classification of proteins, structure of proteins, properties of proteins • Reactions involved in food processing, Texturized protein • Effect of processing on proteins **Minerals** • Definition, macro-minerals – Calcium, Phosphorus, Sulphur, Magnesium, Sodium, Potassium and Chloride • Micro-minerals – Iron, Fluorine, Zinc, Copper, Iodine, Cobalt, Chromium and other micronutrients • Sources, excess, deficiency, RDA and effect of processing on minerals	**15**
Unit II	
Flavours • Introduction to taste, Chemical structure and taste • Basic tastes • Taste inhibition and modification • Flavour enhancement • Introduction to odour, molecular structure and flavour, aroma compounds and aroma extraction • Food flavours, astringency, flavours of some food **Colors and pigments**	**15**

• Introduction, Colour systems- CIE System, Munsell system, Hunter system, Lovibond system • Classifications of colours- Natural and artificial • Gloss, Colour pigments- Chlorophyll, Carotenoid. Tetra-pyrol, Anthocyanin, Flavonoids, Tannin, Betalains, Quinones and Xanthones, Caramel	

REFERENCES

1. Food chemistry- H. D. Belitz, W. Grosch, P. Schieberle
2. Food science - By Potter
3. Food Facts & Principles – N. ShakuntalaManay, M. Shadaksharswamy
4. Food chemistry I- Fennama O. R.
5. Principles of food Chemistry- John M. DeMan
6. Biochemistry – Dr. U. Satyanarayan
7. Textbook of Biochemistry – Albert Lehninger
8. Food Science – Sumati R. Mudambi, Shalini M. Rao, M.V.Rajagopal

Semester II

Principles of Food Preservation – Paper I

DSC FTM-B3 – Principles of Food Preservation I

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

Unit I	Hours Alloted
Fundamentals of Food Preservation • Introduction & Definition of Food Preservation • Importance & Need of Food Preservation • Principles of Food Preservation • Techniques of Food Preservation **Food Spoilage** • Definition and Introduction to Food Spoilage • Types and Causes of Food Spoilage • Physico-chemical changes in Food due to Spoilage • Microbial Spoilage of Food- Yeast, Moulds and Bacteria • Enzymatic spoilage of food • Food spoilage by moisture • Food spoilage by temperature • Food spoilage by oxygen, light and time • Food spoilage by insects, rodents and parasites **Control of Access of Micro-organisms** • Asepsis • Filtration & Clarification • Food Hygiene, Sanitation & Disinfection • General Hygiene Practices • Personal Hygiene • Sanitation of Food Processing Equipments	**15**
Unit II	
Food Preservation by High Temperature • Concept & Importance • Definition & Principle • Effect of heat on microorganisms • Thermal death time • Factors affecting heat resistance • Theory & Equipment • Methods- Boiling, Blanching, Pasteurization, Sterilization, UHT & Canning • Effect of high temperature on food • Advantages & Disadvantages	

Food Preservation by Low temperature • Concept & History • Definition & Principle • Effect of cold temperature on microorganisms • Methods of low temperature Preservation- Cellar storage, Refrigeration or Chilling & Freezing • Theory & Equipment • Treatments Prior to Freezing • Effect on food • Advantages & Disadvantages	**15**

REFERENCES

1. Food Science By Potter
2. Food Science By B. Shrilakshmi
3. Food Facts and Principles By ShakuntalaManay
4. Food Processing and Preservation By G. Subbulakshmi, Shobha A Udipi
5. Food Processing Technology By P.J.Fellows
6. Food Safety & Standards Act 2006, Rules 2011, Regulations, 2011 by ILBCO INDIA
7. Fundamentals of Food Microbiology By Ray Bibek&BhuniaArun. CRC Press
8. Principles of Food Science by Indira Gandhi National Open University

Semester II

Principles of Food Preservation – Paper II

DSC FTM-B4 – Principles of Food Preservation II

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

Unit I	**Hours Alloted**
Food Preservation by Drying/Dehydration • Concept & Definition • Underlying Principle • Factors affecting rate of drying • Pretreatments to food before drying • Natural drying- Sun Drying • Artificial Dehydration methods or Types of Dryers- Drum Dryer, Spray Dryer, Tray Dryer, Tunnel Dryer, Vacuum Shelf Dryer, Rotary Dryer, Kiln Dryer, Air lift Dryer, Fluidized Bed Dryer & Freeze Dryer • Theory, Applications & Advantages • Changes in food due to dehydration • Rehydration or Reconstitution **Food Preservation by Irradiation** • History, Introduction, • Definition, Principle, • Kinds of Ionizing radiations, • Measurement of radiations, • Mode of action, • Effect of irradiations on Food, • Effect on micro-organisms, • Classification, Applications, • Packaging of irradiated foods, • Safety & Regulations of irradiated foods	**15**
Unit II	
Recent/Non-destructive methods of Food Preservation • Introduction • Methods- Theory, Equipment & Applications • Dielectric heating • Ohmic heating • Infrared heating • Pulsed electric field processing • High pressure processing	

• Ultrasound heating • Hurdle technology **Food Additives** • Introduction • Functions, Need & Safety • Types of Food Additives • Mode of Action and Applications • Class I Preservatives(Natural) • Class II Preservatives (Artificial) • Chelating agents • Curing agents • Coloring agents • Emulsifying agents • Antioxidants • Humectants • Leavening agents • Stabilizers and Thickeners • Flour improvers	**15**

REFERENCES

1. Food Science By Potter
2. Food Science By B. Shrilakshmi
3. Food Facts and Principles By ShakuntalaManay
4. Food Processing and Preservation By G. Subbulakshmi, Shobha A Udipi
5. Food Processing Technology By P.J.Fellows
6. Food Safety & Standards Act 2006, Rules 2011, Regulations, 2011 by ILBCO INDIA
7. Fundamentals of Food Microbiology By Ray Bibek&BhuniaArun. CRC Press
8. Texbook of Principles of Food Science by Indira Gandhi National Open University

Semester II

Human Nutrition – Paper I

DSC FTM-B5 – Human Nutrition I

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

Unit – I	Hours Alloted
Introduction to Nutrition • Definitions and History • Nutrition research in India **Menu Planning** • Explanation of terms • Planning of balanced diets • The food Guide • Low Cost Balanced Diets • Vegetarian Diets **Nutritional Requirements and Food Security for Adults** • Nutritional Requirements • Food Requirements **Nutritional and Food Requirements for Infants** • Growth and Development during Infancy • Nutritional Requirements • Food Requirements • Low Birth Weight • Preterm Baby • Weaning	**15**
Unit II	
Nutritional and Food Requirements for Preschool Children (1-6 years) • Nutritional Requirements • Factors affecting Nutritional Status • Food Requirements • Nutrition Related Problems of Preschoolers • Feeding Programmes **Nutritional and Food Requirements for and School Children (6-12 years)** • Nutritional Requirements • Factors affecting Nutritional Status • Food Requirements • Packed Lunches • School Lunch Programmes	**15**

REFERENCES

1. B. Srilakshmi (2007) Dietetics, Revised Fifth Edition, New Age International Publishers

2. B. Srilakshmi (2011) Nutrition Science, Third Edition, New Age International Publishers

3. Dr. M. Swaminathan (2006) Advanced Text book on Food and Nutrition, Volume 1 and 2 Second Edition, BAPPCO Publication.

4. Mahan L. K., Escott- Stump, S. and Raymond J. L. (2012): "Krause's Food and the Nutrition Care Process", 13th Edition, Elsevier.

5. Ross, A.C., Caballero B., Cousins R. J., Tucker K.L. and Ziegler T. (2014) Modern Nutrition in Health and Disease. Wolters Kluwer Health / Lippincott Williams and Wilkins. Ed 11th

6. Garrow, J. S., James, W.P.T. and Ralph, A. (2000): Human Nutrition and Dietetics. 10th Edition, Churchill Livingstone.

7. Nix Staci (2013) William's Basic Nutrition and Diet Therapy. Elsevier Ed. 14th.

Semester II

Human Nutrition – Paper II

DSC FTM-B6 – Human Nutrition II

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

Unit I	Hours Alloted
Nutritional and Food Requirements during Adolescence • Nutritional Requirements • Food Habits • Nutritional Problems **Nutritional and Food Requirements for Expectant Mothers** • Physiological Changes • Preconceptual Nutrition • Nutritional Requirements • Food Requirements • General Dietary Problems • Complications • Indian Pregnant Women	**15**
Unit II	
N**utritional and Food Requirements for Lactating Women** • Role of Hormones in Milk Production • Nutritional Requirements • Food Requirements • Indian Nursing Mothers **Nutritional and Food Requirements during Old Age** • Process of Ageing • Nutritional Requirements • Food Requirements • Nutritional Related Problems of old age • Degenerative Diseases • Exercise and Old Age • Drugs and Old Age	**15**

REFERENCES

1. B. Srilakshmi (2007) Dietetics, Revised Fifth Edition, New Age International Publishers

2. B. Srilakshmi (2011) Nutrition Science, Third Edition, New Age International Publishers

3. Dr. M. Swaminathan (2006) Advanced Text book on Food and Nutrition, Volume 1 and 2 Second Edition, BAPPCO Publication.

4. Mahan L. K., Escott- Stump, S. and Raymond J. L. (2012): "Krause's Food and the Nutrition Care Process", 13th Edition, Elsevier.

5. Ross, A.C., Caballero B., Cousins R. J., Tucker K.L. and Ziegler T. (2014) Modern Nutrition in Health and Disease. Wolters Kluwer Health / Lippincott Williams and Wilkins. Ed 11th

6. Garrow, J. S., James, W.P.T. and Ralph, A. (2000): Human Nutrition and Dietetics. 10th Edition, Churchill Livingstone.

7. Nix Staci (2013) William's Basic Nutrition and Diet Therapy. Elsevier Ed. 14th.

Semester II

Computer Basics and Applications – Paper I

DSC FTM-B7 – Computer Basics and Applications I

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

Unit – I	Hours Alloted
Introduction to Computer • Definition of Computer • Characteristics of Computer • Evolution of computer • Generations of Computer • Concept of Hardware and Software **Input/Output Devices** • Input devices - Keyboard • Mouse • Scanner • MICR • OMR Output devices - Monitor • Printers – DOT Matrix • Inkjet • and Laser jet	**15**
Unit II	
Structure and Working of Computer • Block diagram of computer • Functions and Importance of CPU • ALU • Memory Unit • Basic Operations of Computer **Computer Memory** • Memory Concept • Memory Cell • Memory Organisation • Semiconductor memories - RAM, ROM, PROM, EPROM • Secondary storage devices-Magnetic tape • Magnetic disk (floppy disk & hard disk) • Compact disk	**15**

REFERENCES

1. Computer Fundamentals – Sixth Edition-By PradeepK.Sinha, PritiSinha
2. Fundamentals of Computer – Sixth Edition- By V. Rajaraman, NeeharikaAdabala
3. Computer Fundamentals- By Anita Goel (Pearson Publication)
4. Fundamentals of Computer-E.Balguruswamy(McGraw Hill Education)

Semester II

Computer Basics and Applications – Paper II

DSC FTM-B8 – Computer Basics and Applications II

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

Unit I	Hours Alloted
Windows Operating System • Definition of Operating System • Characteristics and Functions of O.S. • Windows - Default icons on desktop • Important terms in windows operating – Icon, Desktop, Drives, Folder, Parts of Windows, Cut, Copy and Paste operations • What is Networking • Types of networking • What is internet • What is browsing • E-Mailing **MS-Word** • Features of MS-Word • Components of MS-Word • Menus in MS-Word • Mail-merge utility • Macros	**15**
Unit II	
MS-Excel • Introduction to MS-Excel • Components of MS-Excel • Formatting options • Sorting and Filtering of data • Some commonly used functions • Generating various charts using data. **MS-PowerPoint** • Introduction to Powerpoint • Creating presentation • Formatting options • Use of animation and tools • Slide transition • Use of hyperlink **MS-Outlook** • Introduction to Outlook • Making Contacts • E-Mail-Using Inbox, Changing inbox, Creating, addressing and sending messages, formatting messages, sending attachments, Opening attachments ,Reading messages, recalling messages, Using outbox, Scheduling event or appointment • Deleting Items	**15**

REFERENCES

1. Microsoft Office 2016 Step By Step – Patrice Anne Rutledge-(Microsoft Press)
2. Learning Microsoft office 2010 – Ramesh Bangia(Khanna Publishers)
3. My office 2016- Paul McFedries-(Pearson Education)
4. Mastering MS Office- Bittu Kumar(V&S Publishers)
5. Computer Fundamentals – Sixth Edition-By PradeepK.Sinha, PritiSinha

DSC FTM-P1 - LAB COURSE I

Sr.No.	Name of Practical
1	Study of Compound Microscope
2	Demonstration, Construction & Working of Autoclave, Hot air oven
3	Demonstration, Construction & Working of Centrifuge and Incubator,
4	Demonstration, Construction & Working of pH meter and Spectrophotometer
5	Demonstration, Construction & Working of Laminar Air Flow
6	Demonstration, Construction & Working of Miscallaneous equipments
7	Study of different ingredients of culture media
8	Preparation of Peptone water
9	Preparation of General Purpose Media
10	Isolation of micro-organisms from air
11	Preparation of Selective and Differential Media
12	Isolation of Intestinal Micro-organisms from different water samples
13	Study of general techniques for isolation of pure cultures
14	Isolation of micro-organisms from soil
15	Enumeration of total viable count of bacteria from milk
16	Preparation of Potato, Dextrose Agar for Yeast, Molds & Fungi
17	Determination of Fungal & Yeast count in a given food sample
18	Simple staining of bacterial cultures
19	Study of Skin microflora to determine person's hygiene
20	Gram staining of bacteria
21	Determination of quality of water using Presumptive test
22	Confirmation of the Presence of Coliform Bacteria in positive Presumptive test
23	Performing the Completed test
24	Determination of Standard or Total Plate counts (SPC/TPC) of given food sample

DSC FTM-P2 - LAB COURSE II

Sr. No.	Name of Experiment
1	Physical Examination of Milk
2	Specific Gravity of Milk
3	Heat Stability of Milk
4	Titrable Acidity of Milk
5	Protein Estimation in Milk
6	Adulteration of Milk & Milk- Water, Canesugar& Starch
7	Methylene Blue Reduction Time &Resazurin Test
8	Total solids & S.N.F of Milk
9	Preparation of Dahi&MishtiDahi
10	Preparation of Chakka
11	Preparation of Shrikhand
12	Preparation of Lassi
13	Preparation of Paneer&Channa
14	Preparation & Quality evaluation of Basundi
15	Preparation & Quality evaluation of Rabri
16	Preparation & Quality evaluation of Khoa
17	Preparation & Quality evaluation of Malai&KandiPedha
18	Preparation & Quality Evaluation of Rasogulla&Rasmalai
19	Preparation of Whey Beverage
20	Preparation of Ice-Cream &kulfi
21	Preparation & Quality Evaluation of Gulab-jamun
22	Preparation & Quality Evaluation of Instant Gulab-jamun
23	Formulation & Quality Evaluation of Flavored Milk
24	Visit to Milk & Milk Products Processing Plants

DSC FTM-P 3 - LAB COURSE III

Sr. No.	Name of Experiment
1	Standardized Recipes
2	Planning of Protein and Energy rich dish.
3	Planning of Vitamin A rich dish.
4	Planning of Vitamin B1 rich dish.
5	Planning of Vitamin B2 rich dish.
6	Planning of Vitamin B3 rich dish.
7	Planning of Vitamin C rich dish.
8	Planning of Calcium rich dish.
9	Planning of Iron rich dish.
10	Planning of Zinc Rich Dish
11	Planning of Fiber rich dish
12	Planning of weaning food for infants (6 -12 months)
13	Planning of mid-day meal for preschool children (1-6 years).
14	Planning of mid-day meal for School children (6- 12 years).
15	Planning of mid-day meal for Adolescents (13- 17 years).
16	Planning of low cost nutritious recipe for pregnant women.
17	Planning of high cost nutritious recipe for pregnant women.
18	Planning of low cost nutritious recipe for lactating mothers
19	Planning of high cost nutritious recipe for lactating mothers
20	Planning of low cost nutritious recipe for old age.

DSC FTM-P 4 - LAB COURSE IV

Sr. No.	Name of Experiment
1	Study of Basic Components of Word document
2	Study of Basic Formatting on Word Document
3	Study of Use of Tables in Word Document
4	Study of Creating Charts in Word
5	Study of Macrosin Word Document
6	Study of Mail Mergein Word Document
7	Study of Hyperlinking in Word Document
8	Study of Creative files preparing using word art and smart art in Word Document
9	Study of Basic Components of Excel document
10	Study of Creating tables inExcel document
11	Study of Formulas in Excel document
12	Study of Functions of Excel document
13	Study of Basic Components of Powerpoint document
14	Study of Preparing Slides
15	Study of Making an Animated Slides
16	Study of Basic Components of Outlook document
17	Study of Mails in Outlook
18	Study of Contacts in Outlook
19	Study of Calendar in Outlook
20	Study of Tasks in Outlook
21	Study of Internet related tasks and Browsing Websites
22	Study of E-Mailing and Google Drive Emailing