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

SHIVAJI UNIVERSITY, KOLHAPUR - 416 004, MAHARASHTRA
www.unishivaji.ac.in, bos@unishivaji.ac.in
शिवाजी विद्यापीठ, कोल्हापूर - ४१६ ००४,महाराष्ट्र
दूरध्वनी - ईपीएबीएक्स - २६०९०००, अभ्यासमंडळे विभाग दुरध्वनी ०२३१—२६०९०९३/९४

SU/BOS/Science/498 **Date: 10/07/2023**

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-II (Sem. III & IV) as per NEP-2020 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-II (Sem. III & IV) as per NEP-2020 degree programme under the Faculty of Science and Technology.

B.Sc.-II (Sem. III & IV) as per NEP-2020			
1.	Computer Science (Opt)	8.	Food Technology &Management (Entire)
2.	Computer Science (Entire)	9.	Biochemistry
3.	Animation (Entire)	10.	Biotechnology (Optional/Vocational)
4.	Information Technology (Entire)	11.	Biotechnology (Entire)
5.	Food Science and Technology (Entire)	12.	Environmental Science (Entire)
6.	Food Science	13.	Pollution
7	Food Science and Quality Control (Entire)		

This syllabus, nature of question and equivalence shall be implemented from the academic year 2023-2024 onwards. A soft copy containing the syllabus is attached herewith and it is also available on university website **www.unishivaji.ac.in**)

The question papers on the pre-revised syllabi of above-mentioned course will be set for the examinations to be held in October /November 2023 & March/April 2024. 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:

1	The Dean, Faculty of Science & Technology	8	P.G. Admission/Seminar Section
2	Director, Board of Examinations and Evaluation	9	Computer Centre/ Eligibility Section
3	The Chairman, Respective Board of Studies	10	Affiliation Section (U.G.) (P.G.)
4	B.Sc. Exam/ Appointment Section	11	Centre for Distance Education

SHIVAJI UNIVERSITY, KOLHAPUR.

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National Education Policy 2020

Syllabus For

B.Sc.

Food Technology and Management (Entire)

Part II

[Syllabus (as per NEP 2020) to be implemented from August, 2022 onwards.]

B.Sc. Food Technology and Management

(Entire)

[Syllabus (as per NEP 2020) to be implemented from August, 2022 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. 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.

B.Sc. (Food Technology and Management)

Program Outcome

- 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 Technology 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 Outcome

- Increase the employability of women in the food processing sector of Indian economyand this has been accorded priority in policy making.
- 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 inculcatethe 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 FoodProcessing and Preservation.
- Inculcating entrepreneurship attitude and self-employment attitude in students.

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

Structure of B.Sc. Food Technology and Management (Entire) Sem I and II

Structure - I

SEMESTER –I(Duration – 6 Months)																			
Sr. No.	Course (Subject) Time	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	DSC-FTM-A1	2	3	2.4		-	-	-		10	4		2	40	14	PRACTICAL EXAMINATION IS ANNUAL			
2	DSC-FTM-A2	2	3	2.4		-	-	-		10	4		2	40	14				
3	DSC-FTM-A3	2	3	2.4		-	-	-		10	4		2	40	14				
4	DSC-FTM-A4	2	3	2.4		-	-	-		10	4		2	40	14				
5	DSC-FTM-A5	2	3	2.4		-	-	-		10	4		2	40	14				
6	DSC-FTM-A6	2	3	2.4		-	-	-		10	4		2	40	14				
7	AECC-A	4	4	3.2		-	-	-		10	4		2	40	14				
8	SEC-I (VBC-I) (Compulsory)	2	-							-	-		-	50	18				
9	Laboratory Course I	-	-	-		4	8	6.4		-	-		-	-	-				
10	Laboratory Course II	-	-	-		4	8	6.4		-	-		-	-	-				
	Total	**18**	**22**	**17.6**		**8**	**16**	**12.8**		**70**	**-**		**-**	**330**	-				

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

Structure of B.Sc. Food Technology and Management (Entire)

Structure -II

SEMESTER –II (Duration – 6 Months)																				
Sr. No.	Course (Subject) Time	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	DSC-FTM-B1	2	3	2.4		-	-	-		10	4		2	40	14	As per BOS guidelines		-	-	
2	DSC-FTM-B2	2	3	2.4		-	-	-		10	4		2	40	14			-	-	
3	DSC-FTM-B3	2	3	2.4		-	-	-		10	4		2	40	14			-	-	
4	DSC-FTM-B4	2	3	2.4		-	-	-		10	4		2	40	14			-	-	
5	DSC-FTM-B5	2	3	2.4		-	-	-		10	4		2	40	14			-	-	
6	DSC-FTM-B6	2	3	2.4		-	-	-		10	4		2	40	14			-	-	
7	AECC-B	4	4	3.2		-	-	-		10	4		2	40	14			-	-	
8	SEC-II (VBC-II) (Compulsory)	2	-							-	-		-	50	18			-	-	
9	Laboratory Course I	-	-	-		4	8	6.4		-	-		6	-	-			100	35	
10	Laboratory Course II	-	-	-		4	8	6.4		-	-		6	-	-			100	35	
	Total	**18**	**22**	**17.6**		**8**	**16**	**12.8**		**70**	-		-	**330**	-			**200**	-	
	Grand Total	**36**	**44**	**35.2**		**16**	**32**	**25.6**		**140**	-		-	**660**				**200**	-	
• Student Contact Hours per week:32 Hours (Min)										Total Marks for B.Sc-I(Including English):1000								-	-	
• Theory and Practical Lectures-48 Minutes Each										Total Credits for B.Sc Part-I: 52										
• AECC-Ability Enhancement Compulsory Course(A+B)-English																				
• DSC-Discipline Specific Course																				
• Practical examination will be conducted annually for **100** marks per course																				
• There shall be separate passing for internal and University theory and also for practical examinations																				
• SEC: Skill Enhancement Courses includes Skill based and Value based Courses • In case of VBC I and II there will be 25 Multiple Choice Questions of 2 marks each and minimum 18 marks are recruited for passing																				

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

Structure of B.Sc. Food Technology and Management (Entire)

Sem III and IV

Structure - III

SEMESTER –III (Duration – 6 Months)																				
Sr. No.	Course (Subject) Time	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	DSC-FTM-C1	2	3	2.4		-	-	-		10	4		2	40	14					
2	DSC-FTM-C2	2	3	2.4		-	-	-		10	4		2	40	14					
3	DSC-FTM-C3	2	3	2.4		-	-	-		10	4		2	40	14					
4	DSC-FTM-C4	2	3	2.4		-	-	-		10	4		2	40	14					
5	DSC-FTM-C5	2	3	2.4		-	-	-		10	4		2	40	14					
6	DSC-FTM-C6	2	3	2.4		-	-	-		10	4		2	40	14					
7	AECC-C	4	4	3.2		-	-	-		10	4		2	40	14					
8	SEC-III (VBC-III) (Compulsory)	2	-							-	-		-	50	18					
9	Laboratory Course III	-	-	-		4	8	6.4		-	-		-	-	-					
10	Laboratory Course IV	-	-	-		4	8	6.4		-	-		-	-	-					
	Total	**18**	**22**	**17.6**		**8**	**16**	**12.8**		**70**	**-**		**-**	**330**	-					

PRACTICAL EXAMINATION IS ANNUAL

Structure of Program and List of Courses are as follows:

Structure of B.Sc. Food Technology and Management (Entire)

Structure IV

SEMESTER –IV (Duration – 6 Months)																				
Sr. No.	Course (Subject) Time	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	DSC-FTM-D1	2	3	2.4		-	-	-	10	4		2	40	14	As per BOS guidelines			-	-	
2	DSC-FTM-D2	2	3	2.4		-	-	-	10	4		2	40	14				-	-	
3	DSC-FTM-D3	2	3	2.4		-	-	-	10	4		2	40	14				-	-	
4	DSC-FTM-D4	2	3	2.4		-	-	-	10	4		2	40	14				-	-	
5	DSC-FTM-D5	2	3	2.4		-	-	-	10	4		2	40	14				-	-	
6	DSC-FTM-D6	2	3	2.4		-	-	-	10	4		2	40	14				-	-	
7	AECC-D	4	4	3.2		-	-	-	10	4		2	40	14				-	-	
8	SEC-IV (VBC-IV) (Compulsory)	2	-						-	-		-	50	18				-	-	
9	Laboratory Course III	-	-	-		4	8	6.4	-	-		6	-	-				100	35	
10	Laboratory Course IV	-	-	-		4	8	6.4	-	-		6	-	-				100	35	
	Total	**18**	**22**	**17.6**		**8**	**16**	**12.8**	**70**	-		-	**330**	-				**200**	-	
	Grand Total	**36**	**44**	**35.2**		**16**	**32**	**25.6**	**140**	-		-	**660**					**200**	-	
• Student Contact Hours per week:32 Hours (Min)									Total Marks for B.Sc-I(Including English):1000									-	-	
• Theory and Practical Lectures-48 Minutes Each									Total Credits for B.Sc Part-I: 52											
• AECC-Ability Enhancement Compulsory Course(A+B)-English																				
• DSC-Discipline Specific Course																				
• Practical examination will be conducted annually for **100** marks per course																				
• There shall be separate passing for internal and University theory and also for practical examinations																				
• SEC: Skill Enhancement Courses includes Skill based and Value based Courses • In case of VBC I and II there will be 25 Multiple Choice Questions of 2 marks each and minimum 18 marks are recruited for passing																				

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

Structure of B.Sc. Food Technology and Management (Entire) Sem V and VI

Structure V

SEMESTER –V (Duration – 6 Months)																			
Sr. No.	Course (Subject) Time	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	DSC-FTM-E1	2	3	2.4		-	-	-		10	4		2	40	14	PRACTICAL EXAMINATION IS ANNUAL			
2	DSC-FTM-E2	2	3	2.4		-	-	-		10	4		2	40	14				
3	DSC-FTM-E3	2	3	2.4		-	-	-		10	4		2	40	14				
4	DSC-FTM-E4	2	3	2.4		-	-	-		10	4		2	40	14				
5	DSC-FTM-E5	2	3	2.4		-	-	-		10	4		2	40	14				
6	DSC-FTM-E6	2	3	2.4		-	-	-		10	4		2	40	14				
7	AECC-E	4	4	3.2		-	-	-		10	4		2	40	14				
8	SEC-V (VBC-V) (Compulsory)	2	-							-	-		-	50	18				
9	Laboratory Course V	-	-	-		4	8	6.4		-	-		-	-	-				
10	Laboratory Course VI	-	-	-		4	8	6.4		-	-		-	-	-				
11	Project					8	8	6.4					6	100	35				
	Total	**18**	**22**	**17.6**		**16**	**24**	**19.2**		**70**	**-**		**-**	**430**	-				

Structure of Program and List of Courses are as follows:

Structure of B.Sc. Food Technology and Management (Entire)

Structure VI

SEMESTER –VI (Duration – 6 Months)																			
Sr. No.	Course (Subject) Time	TEACHING SCHEME							EXAMINATION SCHEME										
		THEORY				PRACTICAL			Theory						Practical				
									Internal			University							
		Credits	No. of lecture	Hours		Credits	No. of lectures	Hours	Max Marks	Min Marks		Hours	Max Marks	Min Marks	Hours		Max Marks	Min Marks
1	DSC-FTM-F1	2	3	2.4		-	-	-	10	4		2	40	14	As per BOS guidelines		-	-
2	DSC-FTM-F2	2	3	2.4		-	-	-	10	4		2	40	14			-	-
3	DSC-FTM-F3	2	3	2.4		-	-	-	10	4		2	40	14			-	-
4	DSC-FTM-F4	2	3	2.4		-	-	-	10	4		2	40	14			-	-
5	DSC-FTM-F5	2	3	2.4		-	-	-	10	4		2	40	14			-	-
6	DSC-FTM-F6	2	3	2.4		-	-	-	10	4		2	40	14			-	-
7	AECC-F	4	4	3.2		-	-	-	10	4		2	40	14			-	-
8	SEC-VI (VBC-VI) (Compulsory)	2	-						-	-		-	50	18			-	-
9	Laboratory Course V	-	-	-		4	8	6.4	-	-		6	-	-			100	35
10	Laboratory Course VI	-	-	-		4	8	6.4	-	-		6	-	-			100	35
11	Project					8	8	6.4									100	35
	Total	**18**	**22**	**17.6**		**16**	**24**	**19.2**	**70**	-		-	**330**	-			**300**	-
	Grand Total	**36**	**44**	**35.2**		**32**	**48**	**38.4**	**140**	-		-	**660**				**300**	-
• Student Contact Hours per week:32 Hours (Min)									Total Marks for B.Sc-I(Including English):1000								-	-
• Theory and Practical Lectures-48 Minutes Each									Total Credits for B.Sc Part-I: 52									
• AECC-Ability Enhancement Compulsory Course(A+B)-English																		
• DSC-Discipline Specific Course																		
• Practical examination will be conducted annually for **100** marks per course																		
• There shall be separate passing for internal and University theory and also for practical examinations																		
• SEC: Skill Enhancement Courses includes Skill based and Value based Courses • In case of VBC I and II there will be 25 Multiple Choice Questions of 2 marks each and minimum 18 marks are recruited for passing																		

SHIVAJI UNIVERSITY, KOLHAPUR.

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

Syllabus For

B.Sc. Part - II

Food Technology and Management (Entire)

SEMESTER III AND IV

[Syllabus (as per NEP 2020) to be implemented from August, 2022 onwards.]

B.Sc. Food Technology and Management (Entire)

Semester III and IV

[Syllabus (as per NEP 2020) to be implemented from August, 2022 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 Managements a separate course (subject) from B. Sc.
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.

B.Sc. (Food Technology and Management)

Program Outcome

- 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 Technology 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 Outcome

- Increase the employability of women in the food processing sector of Indian economyand this has been accorded priority in policy making.
- 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 FoodTechnology and Management.
- Creating necessary awareness amongst students regarding the laws affecting FoodProcessing and Preservation.
- Inculcating entrepreneurship attitude and self-employment attitude in students.

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

Structure of B.Sc. Food Technology and Management (Entire)

Sem III and IV

Structure - III

SEMESTER –III (Duration – 6 Months)																				
Sr. No.	Course (Subject) Time	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	DSC-FTM-C1	2	3	2.4		-	-	-		10	4		2	40	14					
2	DSC-FTM-C2	2	3	2.4		-	-	-		10	4		2	40	14					
3	DSC-FTM-C3	2	3	2.4		-	-	-		10	4		2	40	14					
4	DSC-FTM-C4	2	3	2.4		-	-	-		10	4		2	40	14					
5	DSC-FTM-C5	2	3	2.4		-	-	-		10	4		2	40	14					
6	DSC-FTM-C6	2	3	2.4		-	-	-		10	4		2	40	14					
7	AECC-C	4	4	3.2		-	-	-		10	4		2	40	14					
8	SEC-III (VBC-III) (Compulsory)	2	-							-	-		-	50	18					
9	Laboratory Course III	-	-	-		4	8	6.4		-	-		-	-	-					
10	Laboratory Course IV	-	-	-		4	8	6.4		-	-		-	-	-					
	Total	**18**	**22**	**17.6**		**8**	**16**	**12.8**		**70**	**-**		**-**	**330**	-					

PRACTICAL EXAMINATION IS ANNUAL

Structure of Program and List of Courses are as follows:

Structure of B.Sc. Food Technology and Management (Entire)

Structure IV

SEMESTER –IV (Duration – 6 Months)																				
Sr. No.	Course (Subject) Time	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	DSC-FTM-D1	2	3	2.4		-	-	-	10	4		2	40	14	As per BOS guidelines			-	-	
2	DSC-FTM-D2	2	3	2.4		-	-	-	10	4		2	40	14				-	-	
3	DSC-FTM-D3	2	3	2.4		-	-	-	10	4		2	40	14				-	-	
4	DSC-FTM-D4	2	3	2.4		-	-	-	10	4		2	40	14				-	-	
5	DSC-FTM-D5	2	3	2.4		-	-	-	10	4		2	40	14				-	-	
6	DSC-FTM-D6	2	3	2.4		-	-	-	10	4		2	40	14				-	-	
7	AECC-D	4	4	3.2		-	-	-	10	4		2	40	14				-	-	
8	SEC-IV (VBC-IV) (Compulsory)	2	-						-	-		-	50	18				-	-	
9	Laboratory Course III	-	-	-		4	8	6.4	-	-		6	-	-				100	35	
10	Laboratory Course IV	-	-	-		4	8	6.4	-	-		6	-	-				100	35	
	Total	**18**	**22**	**17.6**		**8**	**16**	**12.8**	**70**	-		-	**330**	-				**200**	-	
	Grand Total	**36**	**44**	**35.2**		**16**	**32**	**25.6**	**140**	-		-	**660**					**200**	-	
• Student Contact Hours per week:32 Hours (Min)									Total Marks for B.Sc-I(Including English):1000									-	-	
• Theory and Practical Lectures-48 Minutes Each									Total Credits for B.Sc Part-I: 52											
• AECC-Ability Enhancement Compulsory Course(A+B)-English																				
• DSC-Discipline Specific Course																				
• Practical examination will be conducted annually for **100** marks per course																				
• There shall be separate passing for internal and University theory and also for practical examinations																				
• SEC: Skill Enhancement Courses includes Skill based and Value based Courses • In case of VBC I and II there will be 25 Multiple Choice Questions of 2 marks each and minimum 18 marks are recruited for passing																				

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

i) B. Sc. (FTM. Part II) (Semester III & IV)

Course code	Name of Course	Course code	Name of Course
SEM III		**SEM IV**	
DSC FTM-C1	Human Nutrition-I	**DSC FTM-D1**	Human Nutrition -II
DSC FTM-C2	Food Biochemistry -I	**DSC FTM-D2**	Food Biochemistry -II
DSC FTM-C3	Post-Harvest Technology-I	**DSC FTM-D3**	Post-Harvest Technology -II
DSC FTM-C4	Processing and Preservation of Fruits and Vegetables -I	**DSC FTM-D4**	Processing and Preservation of Fruits and Vegetables -II
DSC FTM-C5	Grain Science and Technology-I	**DSC FTM-D5**	Grain Science and Technology-II
DSC FTM-C6	Food Packaging –I	**DSC FTM-D6**	Food Packaging –II
AECC – C	Environment Studies (Theory)	**AECC – D**	Environment Studies (Project)
SEC – III	-	**SEC - IV**	Internship Training/Field Projects
VBC-III	Sports/Cultural/ NSS/NCC	**VBC-IV**	Sports/Cultural/NSS/NCC

- DSC FTM: - Discipline Specific Core Course Food technology andManagement
- AECC: - Ability Enhancement Compulsory Course: Compulsory English
- SEC: - Skill Enhancement Course
- VBC: Value Based Course (NSS/NCC/Sports/Cultural, etc.)

Practical

DSC FTM-P3	Laboratory Course III (Based on DSC FTM-C1, DSC FTM-D1, DSC FTM-C2 and DSC FTM-D2)
DSC FTM-P4	Laboratory Course IV (Based on DSC FTM-C3 and DSC FTM-D3 and DSC FTM-C4 and DSC FTM-D4)

Course Outcomes-B.Sc. (FTM) Part II (Sem III)

Class	Course code / Course Name	Course outcome
B. Sc. **(FTM) II** **Semester III** **CBCS**	**DSC FTM C1** **Human Nutrition I**	1. Better understanding on the physiological and metabolic functions of nutrients. **2.** Gain in-depth knowledge of the physiological and metabolic role of macro nutrients, fat soluble and water soluble vitamins, electrolytes and their importance in human nutrition.
	DSC FTM C2 **Food Biochemistry I**	**1.** Capable of describing biochemical pathways relevant in nutrient metabolism **2.** Capable of using selected biochemical techniques that are relevant for the investigation of the nutrient metabolism.
	DSC FTM C3 **Post Harvest Technology I**	1. Explain the principles of post-harvest technology. 2. Illustrate the physiological and biochemical changes occurring during various stages of fruits and vegetables development and production.

	DSC FTM C4 **Processing and Preservation of fruits and vegetables I**	1. Explain different processing and preservation of fruits and vegetables **2.** Discuss various processing and preservation techniques.
	DSC FTM C5 **Grain science technology I**	1. Know about structure and composition of cereals, pulses and oil seeds. **2.** Get exposure to the preparation of products from cereals, pulses and oil seeds
	DSC FTM C6 **Food Packaging I**	**1.** Apply and examine the knowledge of properties for selection of packaging materials for food products **2.** Evaluate new and emerging technology and related underpinning science in food packaging
	AECC- C **Environment studies (Theory)**	**1.** Discover knowledge in ecological perspective and value of environment. **2.** Understand the significance of various natural resources and its management.

B.Sc.(FTM) II Semester III
DSC FTM C1-Human Nutrition I
Credit 2

Unit – I	Hours Alloted
Introduction to Human Nutrition • Definitions- Nutrition, Nutrients, Nutritional status, Health, Malnutrition • Role of Nutrition in maintaining good health • Classification of Nutrients • Recent Developments **Factors affecting Food consumption and Nutritional status** • Socioeconomic Factors • Cultural Influences • Life style and food habits • Production and Food Distribution • Health Condition	**15**
Unit II	
Balanced Diets • Recommended Dietary Allowances • Food Exchange List • Food Pyramid • Planning Diets • General Dietary Guidelines **Diets during Infancy** • Nutritional Requirements • Artificial Feeding • Low Birth weight baby • Pre-term baby	**15**

• Weaning **Diets for Pre-school children (1 to 6 years)** • Nutritional Requirements • Protein Energy Malnutrition • Feeding Programs	

References:

1. Joshi Shubhangini A (2015) , Nutrition and Dietetics – 4th edition, Mc Graw Hill Education (India) Private Limited.
2. ShrilakshmiB. (2016), Human Nutrition (For B.Sc. Nursing students)- 2nd edition, New Age International (P) Limited, Publishers.
3. Sharma Monika (2022) Textbook of Nutrition and Dietetics – 3rd edition, CBS Publishers & distributors Pvt. Ltd
4. ShrilakshmiB. (2019), Dietetics- 8th edition, New Age International (P) Limited, Publishers.Krause and Mahan, (2015), Food and Nutrition Care Process, 14th edition; Elsevier, New York.
5. Shrilakshmi B, (2019), Nutrition Science, New Age International Publishers, New Delhi, India.
6. Shrilakshmi B, (2019), Human Nutrition (For B.Sc. Nursing Students), New Age International Publishers, New Delhi, India.

B.Sc. (FTM) Part II Semester III

DSC FTM C2-Food Biochemistry– Paper I

Credit 2

Unit – I	**Hours Allotted**
Metabolism of Carbohydrates • Digestion and Absorption of Carbohydrates • Glycolysis • Kreb's cycle • Electron Transport Chain • Gluconeogenesis • Glycogen metabolism • HMP pathway • Inborn errors of Carbohydrate metabolism	**15**
Unit – II	
Protein metabolism • Digestion and absorption of proteins • Transamination • Deamination • Urea cycle • Inborn errors of protein metabolism	**15**

References:

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

B.Sc. (FTM) Part II Semester III

DSC FTM C3-Post Harvest Technology - Paper I

Credit 2

Unit - I	**Hours Allotted**
Importance of Post Harvest Technology ● Need of post-harvest technology ● Pre-harvesting factors ● Post-harvesting factors **Harvesting** ● Introduction ● Methods of harvesting ● Necessary care during harvesting	**15**
Unit - II	
Post Harvest Treatments ● Introduction ● Pre cooling, Cleaning , Sorting, grading and sizing ● High temperature and Chemical treatments ● Fruit coating ● Astringency removal ● Irradiation **Post Harvest Systems and Food Losses** ● Definition ● Main elements of post harvest systems ● Post harvest losses ● Types of losses	**15**

References

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

B.Sc. (FTM) Part II Semester III

DSC FTM C4- Processing & Preservation of Fruits & vegetables I

Credit 2

Unit – I	**Hours Allotted**
Fruit processing ● Jam – Specifications, Processing & Problems in Jam Production ● Jelly and Marmalade-Specifications, Processing & Problems in Jelly and Marmalade Production ● Preserve and Candy -Specifications, Processing & Problems in preserve and Candy Production ● Crystallized and Glazed fruits- Specifications, Processing & Problems in crystallized and glazed fruits **Vegetables Processing** ● Pickles- Types, Problems, Defects and Spoilage in pickles ● Chutney and sauces - Classification and processing ● Tomato processing - Products their specification and processing **Techniques of Fruits & Vegetables Processing** • Current Status of Production & Processing of Fruits & Vegetables • Canning of Fruits & Vegetables – Principle & Process • Containers for Packing of Canned Products – Tin Cans & Glass containers • Bottling of Fruits – Filling, Syruping, Exhausting • Canning of Curied Vegetables • Causes of Spoilage of Canned Foods – Physical, Chemical & Microbial Changes	**15**

Unit – II	
Drying/Dehydration of Fruits & Vegetables • Sun-drying of Fruits & vegetables • Factors affecting rate of Drying/Dehydration • Principle & Pretreatments for drying/dehydration • Process of Drying/Dehydration of fruits & vegetables • Types of Driers – Air Convection Driers, Drum/Roller Driers, Vacuum Driers • Spoilage of Dried Products • Reconstitution test for Dried/Dehydrated Products • Food Concentration – Methods of Concentration • Changes during Concentration **Freezing of Fruits & Vegetables** • Freezing Process for Fruits & Vegetables • Sharp Freezing, Cryogenic freezing • Quick Freezing – Methods • Changes during Freezing • Changes during Storage	**15**

References

1) Fruit & Vegetable Preservation, Principles and Practices - R P Srivastav & Sanjeev Kumar

2) Preservation of fruits and vegetables - Girdhari Lal & T D Tandon

3) Principles of Fruit Preservation – T.N. Morris

4) Handbook of fruit science and technology - Salunkhe D.K, Kadam S.S

5) Preservation of fruit and vegetables - Bhatiya Vijaya

6) Fruits: Tropical & Subtropical- T K Bose, S K Mitra, D Sanyal.

7) Modern Technology of Tomato Processing & Dehydration – EIRI Board of Consultants & Engineers.

8) Food preservation Techniques – Atul Agnihotri

9) Fruit & Vegetable preservation – N.P. Singh

10) Fruit & Vegetable Preservation Techniques – R. K. Narang

B.Sc. (FTM) Part II Semester III

DSC FTM C5-Grain Science Technology- Paper I

Credit 2

Unit –I	Hours Allotted
Milling of Cereals ● Wheat Milling - Introduction, Types, Milling methods and products of wheat ● Rice Milling - Introduction, Types, Milling methods and products of rice ● Corn Milling- Introduction, Types, Milling methods and products of corn	**15**
Unit - II	
Milling of Millet ● Sorghum- Introduction, Types, Milling methods, Products and by products of sorghum ● Ragi- Introduction, Types, Milling methods, Products and by products of ragi ● Bajara - Introduction, Types, Milling methods, Products and by products of bajara	**15**

References:

1. Postharvest Technology of Cereals, Pulses and Oilseeds- Chakravarti A.
2. Technology of cereals- Kent, N.L.
3. Legumes: Chemistry and Technology and Human Nutrition- Kent, N.L.
4. Wheat: Chemistry and Technology- Pomeranz
5. Modern Cereal Science and Technology-Pomeranz,
6. Handbook of World Food Legume: Chemistry- Salunkhe, D.K., Kadam

7. Quality of Wheat and Wheat Production- Salunkhe, D.K., Kadam and Austin
8. Foods: Facts and Principles- Dr. (Mrs) N. Shakuntala Manay
9. Food Science- B Srilakshmi

B.Sc. (FTM) Part II Semester III

DSC FTM C6-Food Packaging - Paper I

Credit 2

Unit -I	**Hours Allotted**
Basic of Food Packaging ● Introduction to food Packaging ● Functions of packaging ● Classification of packages-Primary, secondary & Tertiary **Packaging Material** ● Plastics- Introduction, Applications and Types ● Metals- Introduction, Types, Lacquers	**15**
Unit - II	
● **Paper and Paper board -** Introduction, properties and Types ● **Glass-** Definition, Composition, Types, Attributes of glass containers **Properties in packaging materials** ● Thickness ● Tensile Strength ● The Bursting Strength ● Water Vapour Transition Rate ● Gas Transition Rate& Oxygen Transition Rate ● Grease and Tear Resistance for papers ● Impact strength test for Plastics ● Heat seal strength	**15**

References

1. A Handbook On Food Packaging ,P.Jacob John

2. Food Packaging ,Prof.NeelamKhetarpaul and Dr.DarshanPunia

3. Food Packaging , Takashi Kadoya

4. Handbook of Food Processing , Packaging and Labelling, Jerry D’souza and JatinPradhan
5. Aseptic Processing & Packaging of Food A Food Industry Perspective, Jairus R.D David, Ralph H. Graves and V.R. Carlon
6. Innovations in Food Packaging (second Edition), Jung H. Han

Course Outcomes-B.Sc. (FTM) Part II (Sem IV)

Class	Course code / Course Name	Course outcome
C. Sc. **(FTM) II** **Semester IV** **CBCS**	**DSC FTM D1** **Human Nutrition II**	1. Understanding the nutritional requirements through the life cycle. 2. Gain knowledge on changes during various stages of growth and development throughout life cycle.
	DSC FTM D2 **Food Biochemistry II**	1. It will help to understand about the concept of food digestion and absorption 2. Students can learn the techniques of food and its health benefits, Make learn the role of enzymes and their importance in food digestion
	DSC FTM D3 **Post Harvest Technology II**	1. Analyse various aspects of quality control and evaluation. 2. Post harvest losses and preventive measures; Post harvest operations; Handling & transportation; Supply chain management & storage; Quality assurance and control
	DSC FTM D4 **Processing and Preservation of fruits and vegetables II**	1. Identify high end techniques in fruits and vegetables processing and preservation. 2. Compare various food processing technology.

	DSC FTM D5 **Grain science technology II**	1. Discuss pulse processing and preservation techniques. 2. Identify oil seed processing and preservation.
	DSC FTM D6 **Food Packaging II**	1. Demonstrate advanced knowledge and skills in selecting packaging materials and technologies based on the characteristics of food product and characteristics of packaging materials and storage and distribution of requirements
	AECC- D **Environment studies** **(Project)**	1. Enrich the knowledge on themes of biodiversity, natural resources, pollution control and waste management. 2. Understand the constitutional protection given for environment.

B.Sc.(FTM) II Semester IV
DSC FTM D1-Human Nutrition II
Credit 2

Unit – I	Hours Allotted
Diets for school going children (7 to 12years) • Nutritional Requirements • Diet related problems • Packed Lunches • School Programs **Diets for Adolescence (7 to 12years)** • Nutritional Requirements • Food Requirements • Nutritional Problems	**15**
Unit II	
Diet during Pregnancy • Nutritional Requirements • Food Requirements • General Dietary Problems • Exercise or Physical activity **Diet during Lactation** • Nutritional Requirements • Food Requirements **Diet during Old age** • Nutritional Requirements • Food Requirements • Nutrition related Problems	**15**

References:

1. Joshi Shubhangini A (2015), Nutrition and Dietetics – 4th edition, Mc Graw Hill Education (India) Private Limited.
2. ShrilakshmiB. (2016), Human Nutrition (For B.Sc. Nursing students)- 2nd edition, New Age International (P) Limited, Publishers.
3. Sharma Monika (2022) Textbook of Nutrition and Dietetics – 3rd edition, CBS Publishers &Distributors Pvt. Ltd
4. ShrilakshmiB. (2019), Dietetics- 8th edition, New Age International (P) Limited, Publishers.
5. Krause and Mahan, (2015), Food and Nutrition Care Process, 14th edition; Elsevier, New York.
6. Shrilakshmi B, (2019), Nutrition Science, New Age International Publishers, New Delhi, India.
7. Shrilakshmi B, (2019), Human Nutrition (For B.Sc. Nursing Students), New Age International Publishers, New Delhi, India.

B.Sc (FTM) Part II Semester IV
DSC FTM D2-Food Biochemistry– Paper II
Credit 2

Unit – I	**Hours Alloted**
Lipid metabolism • Digestion and absorption of Lipids • Oxidation of fatty acids • Ketone bodies • Lipoproteins • Metabolism of Adipose tissue • Cholesterol metabolism • Inborn errors of lipid metabolism	**15**
Unit – II	
Enzymes • Definition and Classification • Active site of enzyme • Enzyme specificity • Mechanism of enzyme action • Factors affecting enzyme activity **Hormones** • Definition and Classification • Mechanism of action • Biochemical functions and disorders of pituitary, thyroid, adrenal, parathyroid and pancreatic hormones	**15**

• Gastrointestinal hormones and sex hormones	

References:

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

B.Sc. (FTM) Part II Semester IV

DSC FTM D3-Post Harvest Technology - Paper II

Credit 2

Unit - I	**Hours Allotted**
Important Factors In Post Harvest Technology ● Biological factors ● Environmental factors **Methods to detect the maturity** ● External methods ● Internal methods ● Physical methods ● Chemical methods	**15**
Unit - II	
Post Harvest Disorders ● Physiological disorders ● Mineral deficiency disorders **Recent Development in Post Harvest Technology** ● TTI (Time-temperature indicator) Technology ● Ethylene Controlling Technologies ● Antimicrobial active systems ● Smart Packaging Technologies	**15**

References

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

B.Sc. (FTM) Part II Semester IV

DSC FTM D4-Processing & Preservation of Fruits & vegetables- Paper II

Credit 2

Unit – I	**Hours Allotted**
Fruit Beverages ● **Un-fermented Beverages-** FPO specifications, Classifications and Manufacturing ● **Fermented Beverages-** FPO specifications, Classifications and Manufacturing **Vegetable Processing** ● **Potato processing -** Important consideration and Products ● **Mushroom Processing -**Classification, Preservation Techniques, Processed products of mushroom	**20**
Unit II	
Value Added Products of fruits and vegetables **Saurkraut** - Principle, Processing, Defects and Spoilage **Some Other Valuable Products from Fruits & Vegetables** ● Processing of Amchur ● Processing of Mango Leather ● Processing of Fruit Cheese ● Processing of Fruit Butter ● Processing of Fruit Toffee ● Processing of Papain	**10**

References

1) Fruit & vegetable preservation, Principles and Practices - R P Srivastav & Sanjeev Kumar

2) Preservation of fruits and vegetables - Girdhari Lal & T D Tandon

3) Principles of Fruit Preservation – T.N. Morris

4) Handbook of fruit science and technology - Salunkhe D.K, Kadam S.S.

5) Preservation of fruit and vegetables - Bhatiya Vijaya

6) Fruits: Tropical & Subtropical- T K Bose, S K Mitra, D Sanyal

7) Modern Technology of Tomato Processing & Dehydration – EIRI Board of Consultants & Engineers

8) Food preservation Techniques – Atul Agnihotri

9) Fruit & Vegetable preservation – N.P. Singh

10) Fruit & Vegetable Preservation Techniques – R. K. Narang

B.Sc. (FTM) Part II Semester IV

DSC FTM D5-Grain Science Technology- Paper II

Credit 2

Unit –I	Hours Allotted
Processing of pulses ● Milling of pulses ● Processed products of pulses **Oil Processing** ● Pre-treatment of oilseed ● Methods of recovering oils and fats	**15**
Unit - II	
Processing of oils and fats ● Rendering of animal fat ● Post-extraction/pre-refining processing ● Processing of Oil seed meal ● Refining of crude oil **Modification of oil** • Hydrogenation, fractionization, winterization • Anti-nutritional factors in oilseed and nuts • Quality assessment of oils and fats	**15**

References:

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

5. Food Science (sixth edition) – B Srilakshmi
6. Food Facts and Principles (Third revised edition) – N Shakuntala Manay, M Shadaksha

B.Sc. (FTM) Part II Semester III

DSC FTM C6-Food Packaging - Paper II

Credit 2

Unit –I	Hours Allotted
Modern Packaging Systems ● Introduction ● Active packaging ● Controlled and Modified atmospheric packaging (CAP and MAP) ● Aseptic packaging ● Packages for microwave ovens ● Biodegradable packaging ● Edible gums and coating ● Vacuum packaging machine ● CA & MA packaging machine ● Gas Packaging machine ● Seal and Shrink packaging machine ● Form and Fill Sealing machine ● Retort pouches ● Bottling machine and carton making machine	**15**
Unit - II	
Different Packaging Systems for processed foods ● Dehydrated foods(snacks) ● Frozen foods and beverages ● Dairy Products ● Fresh and vegetables ● Bakery & cereals ● Meat, poultry and sea foods	**15**

• Novel Food Packaging for space foods • Importance of Eco- friendly packaging and sustainability **Packaging Laws and regulations** • Laws and regulations affecting food products • Class A & Class B commodities • General guidelines on giving declaration according to FSSAI • Physical distribution of packaged foods • New trends in packaging design • Emerging Packaging industry trends • Biodegradable packaging in food industry • The vision for future packaging	

References

1. International Pvt. Ltd. New Delhi- 110 002A Handbook On Food Packaging ,P.Jacob John

2. Food Packaging ,Prof.NeelamKhetarpaul and Dr.DarshanPunia

3. Food Packaging , Takashi Kadoya

4. Handbook of Food Processing, Packaging and Labelling, Jerry D'souza and JatinPradhan

5. Aseptic Processing & Packaging of Food A Food Industry Perspective, Jairus R.D David, Ralph H. Graves and V.R. Carlon

6. Innovations in Food Packaging (second Edition), Jung H. Han

DSC FTM-P1 - 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 Zinc Rich Dish
13.	Planning of weaning food for infants (6 -12 months)
14.	Planning of mid-day meal for preschool children (1-6 years
15.	lanning of mid-day meal for School children (6- 12 years).
16.	Planning of mid-day meal for Adolescents (13- 17 years).
17.	Planning of low cost nutritious recipe for pregnant women.
18.	Planning of high cost nutritious recipe for pregnant women
19.	Planning of low cost nutritious recipe for lactating mothers
20.	Planning of high cost nutritious recipe for lactating mothers
21.	Planning of low cost nutritious recipe for old age
22.	Study of Colorimeter
23.	Preparation of solutions

24.	Qualitative tests for Carbohydrates
25.	Qualitative tests for Proteins
26.	Verification of Beer’s And Lambert’s law

DSC FTM-P2 - LAB COURSE IV

Sr. No.	Name of the Practical
1.	Morphological Characteristics of cereals
2.	Physical properties of cereals
3.	study the cooking quality of rice
4.	effect of kneading on development of gluten
5.	Process of flaking
6.	Process of puffing
7.	Parboiling of rice
8.	Cooking of dal
9.	Sprouting of pulses
10.	Process of popcorn
11.	Preparation of Peanut butter
12.	Preparation of Instant dhokla mix
13.	Preparation of Protein rich product
14.	Study of Equipments for Fruits and Vegetables Processing
15.	Canning of Fruits and Vegetables
16.	Preparation of Apple Jam
17.	Preparation of Lemon RTS
18.	Preparation of Pineapple Squash
19.	Preparation of Syrup
20.	Preparation of Nectar

21.	Preparation of Cordial
22.	Preparation of Potato Wafers
23.	Preparation of Tomato Soup
24.	Preparation of Tomato Chutney
25.	Preparation of Tomato Sauce/Ketchup
26.	Preparation of Chilli Pickle
27.	Preparation of Saurkraut