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

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दूरध्वनी - इपीबीएक्स - २०६०९०००, अभ्यासमंडळे विभाग : ०२३१- २६०९०९४. २६०९४८७
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जा.क्र./शि.वि/अं.म./605 दिनांक:— ०७/१०/२०२५

प्रति,

१. मा. संचालक / प्राचार्य,
सर्व संलग्नीत अभियांत्रीकी महाविद्यालय,
शिवाजी विद्यापीठ, कोल्हापूर

२.संचालक,
स्कुल ऑफ इंजिनिअरींग ॲण्ड टेक्नॉलॉजी,
शिवाजी विद्यापीठ, कोल्हापूर

विषय:— अभ्यासक्रमातील किरकोळ दुरुस्तीबाबत.
संदर्भ:— एसयु/बीओएस/सायन्स&टेक/५३६ दि.०४/०९/२०२५

महोदय,

उपरोक्त संदर्भिय विषयास अनुसररुन आपणास आदेशान्वये कळविण्यात येते की, राष्ट्रीय शैक्षणिक धोरण २०२० नुसार शैक्षणिक वर्ष २०२५—२६ पासून लागू करण्यात आलेल्या खालील अभ्यासक्रमामध्ये किरकोळ दुरुस्ती करण्यात आलेली आहे.

BOS/Adhoc	Course/Syllabus
Food Science & Technology	**B. Sc.** Food Technology & Management (AEDP)
	B. Sc. Food Science (AEDP)

सोबत सदर अभ्यासक्रमाची प्रत जोडली आहे. तसेच विद्यापीठाच्या https://www.unishivaji.ac.in (NEP-2020@suk/ Online syllabus) या संकेस्थळावर ठेवण्यात आला आहे. सदर दुरुस्ती ही शैक्षणिक वर्ष २०२५—२६ पासून लागू राहील.

सदर अभ्यासक्रम सर्व संबधित विद्यार्थी व शिक्षकांच्या निदर्शनास आणून द्यावेत ही विनंती.

कळावे.

आपला विश्वासू,

डॉ. एस. एम. कुबल
उपकुलसचिव
अभ्यास मंडळ विभाग

सोबत — अभ्यासक्रमाची प्रत,
प्रत :— **माहितीसाठी व पुढील योग्यत्या कार्यवाहीसाठी**

मा. संचालक, परीक्षा व मुल्यमापन मंडळ	प्र. अधिष्ठाता, विज्ञान व तंत्रज्ञान विद्याशाखा
अध्यक्ष, **फुड सायन्स ॲण्ड टेक्नॉलॉजी** अस्थायी मंडळ	बी.एस्सी विभागास.
परीक्षक नियुक्ती ए व बी विभागास.	संलग्नता टी. १ व टी. २ विभागास
पीजी प्रवेश विभागास	पीजी सेमिनार विभागास

SHIVAJI UNIVERSITY, KOLHAPUR

Established: 1962

"A++ Grade" Accredited by NAAC (2021) with CGPA 3.52

Structure and Syllabus in Accordance with

Apprenticeship Embedded Degree Programme

National Education Policy – 2020

With Multiple Entry and Multiple Exit

Syllabus for

B. Sc. Part – I

Food Technology & Management

(Faculty of Science and Technology)

Semester I and II

(To be implemented from Academic Year 2025-26)

SYLLABUS OF B.Sc. (FOOD TECHNOLOGY AND MANAGEMENT) I

(AEDP-NEP 2020)

❖ **Year of Implementation:** To be implemented from June 2025 onwards

- Guidelines shall be as per B. Sc. Regular Program.
- Rules and Regulations in accordance with National Education Policy with effect from Academic Year 2025-26.

❖ Apprenticeship Embedded Degree Programme (AEDP):

Programme enabling a student admitted to an undergraduate programme of the Higher Educational Institution, recognized as per the UGC Act, 1956, to pursue apprenticeship training as an integrated component of the degree programme in compliance with these guidelines. Training in an industry or establishment under a contract of apprenticeship, which consists of a basic training component and on-the-job training (OJT)/practical training at the workplace. Further, as per the Apprentices Act of 1961, Apprenticeship training means a course of training in any industry or establishment undergone in pursuance of a contract of apprenticeship and under prescribed terms and conditions, which may be different for different categories of apprentices.

❖ **Objectives of AEDP:**

i. To enhance the employability of students pursuing Undergraduate level degree programmes.
ii. To focus on outcome-based learning in all degree programmes to achieve graduate attributes and desired proficiency levels.
iii. To promote active linkage between higher educational institutions and industries/establishments.
iv. To bridge the skill gap in the industries by effectively implementing AEDP in partnership with higher educational institutions and/or Board of Apprenticeship Training (BOAT)/ Board of Practical Training (BOPT).

❖ Preamble:

The Bachelor of Science in Food Technology and Management program combines

food science with essential management skills, preparing students for leadership roles in the growing food industry. The curriculum covers food safety, processing, product development, and business management, addressing challenges like sustainability, nutrition, and food security. Students gain hands-on experience in food processing, quality assurance, supply chain management, and marketing, while also developing critical business skills. Emphasizing ethical practices, regulatory standards, and sustainability, the program equips graduates to make informed decisions and excel in diverse roles across the food sector.

❖ Program Outcomes:

1. Understanding of Food Science Principles: A comprehensive understanding of the scientific principles underlying food production, processing, preservation, and safety.

2. Food Product Development Skills: Design, develop, and innovate new food products that meet consumer needs and regulatory standards.

3. Knowledge of Food Safety and Quality Control: Knowledge and skills required to implement food safety and quality assurance practices throughout the food supply chain.

4. Food Processing and Engineering Expertise: Understanding of food processing techniques, including thermal and non-thermal methods, and the ability to apply engineering principles to optimize these processes.

5. Sustainability in Food Production: Importance of sustainability in food production, focusing on resource management, waste reduction, and environmentally friendly practices in food manufacturing.

6. Food Business Management: Skills to manage food-related businesses, including planning, marketing, budgeting, and financial management within the food industry.

7. Regulatory and Ethical Standards in Food: National and international food laws, regulations, and ethical standards that govern the food industry.

8. Supply Chain Management in the Food Industry: Manage and optimize food supply chains, from raw material sourcing to distribution, ensuring efficiency and compliance with food safety standards.

9. Analytical and Laboratory Skills: Proficiency in using laboratory techniques and tools to

analyse food products, assess their nutritional content, and test for quality and safety.

10. Consumer Behaviour and Market Trends: Analyse consumer behaviour and market trends to make informed decisions about food product development and marketing strategies.

11. Innovation and Problem-Solving in Food Technology: Ability to critically analyse challenges in the food industry and develop innovative solutions to improve processes, products, and consumer experiences.

12. Communication and Teamwork Skills: Strong communication, collaboration, and leadership skills, enabling them to work effectively in interdisciplinary teams within the food industry.

❖ Objectives of Programme:

1. Understanding Food Science and Processing:

- To provide a strong foundation with the principles of food science, including food chemistry, microbiology, and processing & preservation techniques for development of food products.

2. Ensuring Food Safety and Quality:

- To train students in food safety regulations, quality control measures, and hygiene practices to ensure the production of safe and high-quality food products by implementing food safety management systems.

3. Developing Management and Entrepreneurial Skills:

- To impart knowledge of food industry management, including production planning, marketing, and distribution including fostering an entrepreneurial mindset to encourage innovation and the development of new food products and businesses.

4. Promoting Nutritional Awareness:

- To educate students on the nutritional value of foods and the impact of processing on nutrient content.

5. Fostering Industry Relevance and Practical Skills:

- To provide students with practical experience through laboratory work, industrial training, and projects helping them to bridge the gap between theoretical knowledge and industry practices and preparing them for successful careers in the food sector.

❖ **Duration of Programme:**

3 years B. Sc. Programme or

4 years B.Sc. Programme (Honours Degree) or

4 years B. Sc. Programme (Honours with Research Degree)

❖ **Medium of instruction:** English

❖ **Eligibility for admission:**

The eligibility of students taking admission at B. Sc. Part-I [Level 4.5] (initial entry) and the eligibility of students making lateral entry (Multiple entry-ME) admission at Level 5.0/ Level 5.5/ Level 6.0 are required to be scrutinized (with stipulated procedure) on the basis of following criteria:

(A) Eligibility requirements for admission to B. Sc. Part-I (Level 4.5):

i) The students passing the Higher Secondary School Certificate Examination with Science stream or Vocational subjects with science stream conducted by the Maharashtra State Board of Higher Secondary Education shall be allowed to enter upon the B. Sc. Part-I (or Undergraduate Certificate in Science).

OR

ii) An Examination of any other Statutory Board or an examining Body recognized as equivalent thereto.

OR

iii) Completed 2nd year of the 3-year diploma after 10th

(B) Eligibility requirements for admission to B. Sc. Part-II (Level 5.0):

i) The students passing or ATKT the B. Sc. Part-I (or Undergraduate Certificate in Science) shall be allowed to enter upon the B. Sc. Part-II (or Undergraduate Diploma in Science).

OR

ii) An Examination of any other Statutory University or an examining Body recognized as equivalent there to.

OR

iii) Completed 3-year diploma course with subjects allied / related to the subject at B.Sc. Part I

OR

iv) Completed first year of B.E./B. Tech. with subjects allied / related to the subject at B.Sc. Part I

(C) Eligibility requirements for admission to B. Sc. Part-III (Level 5.5):

i) The students passing (pass/ ATKT) the B. Sc. Part-II (or Undergraduate Diploma in Science) and successfully completed level 5 shall be allowed to enter upon the B.Sc. Part-III (or Three Year Undergraduate Degree in Science).

OR

ii) An Examination of any other Statutory University or an examining Body recognized as equivalent thereto.

OR

iii) Completed second year of B.E./B. Tech. with subjects allied / related to the subject at B.Sc. Part II

(D) Eligibility requirements for admission to B. Sc. Part-IV (Level 6.0):

i) The students passing the B. Sc. Part-III (or Three-Year Undergraduate Degree in Science) with 7.5 CGPA or 75% marks in Three-Year Undergraduate Degree in Science shall be allowed to enter upon the B. Sc. Part-IV (or Four-Year Undergraduate Degree in Science with Honours/ Honours with Research).

OR

ii) An Examination of any other Statutory University or an examining Body recognized as equivalent thereto.

Eligibility Application requirement:

(a) Students who are seeking admission for Level 4.5 need to apply for eligibility.

(b) Students who are not taking any exit from the programme at any level and students re-entering after taking exit, need not

apply for eligibility at Level 5.0, 5.5 and 6.0.

(c) However, students from other university who wish to seek admission for any level of undergraduate degree need to apply for eligibility.

Rules for Multiple Exits:

a) If a student wishes to exit after completion of Level 4.5, he/she has to complete additional four credit skill course/ internship.

b) If a student wishes to exit after completion of Level 5.0, he/she has to complete additional four credit skill course/ internship.

c) If a student wishes to exit after completion of Level 5.5, he/she need not require completing any additional skill course/ internship.

❖ **Pattern of B.Sc. Programme:**

The pattern of program will be of semester type. (A) Weightage: There shall be Undergraduate certificate in science program credits. There shall be Undergraduate diploma in science with 92 credits. There shall be Three Year B.Sc. Programme with 132 credits. The with 48 candidate wishes to attempt for Four-Year B.Sc.(Hon./Research) may opt for 4thyear which will have additional 44 credits, hence, Four Year B.Sc. Programme will require 176 credits.(Please refer the university regulations and structure of the programme for details).

❖ Credit distribution chart for B. Sc. Programme:

a) For 3 year B. Sc. Programme:

Course Name		**Total Credits**	**% of total credits**
Major			
Major Mandatory(MM)	MM	52	
Major Elective(ME)	ME	08	
Vocational Skill Courses(VSC)	VSC	06	
On Job Training(OJT)	OJT	04	**57.58**
Field Project(FP)	FP	02	
Indian Knowledge System	IKS	02	
Community Engagement Programme	CEP	02	
Major Total Credits		**76**	

Minor	MIN	24	18.18
Open Elective (OE)/ Generic Elective(GE)Courses	OE	10	7.58
Ability Enhancement Courses	AEC	08	10.60
Indian Knowledge System(Generic)	IKS	02	6.06%
Value Education Courses	VEC	04	
Skill Enhancement Courses	SEC	06	
Co-Curricular Courses(NSS/NCC/Sports/Cultural Activities)	CC	02	
TOTAL		**132**	**100%**

a)For 4year B.Sc. Programme (Honours Degree)

Course Name		Total Credits	% of total credits
Major			65.91
Major Mandatory	MM	80	
Major Elective	ME	16	
Vocational Skill Courses	VSC	06	
On Job Training	OJT	08	
Field Project	FP	02	
Research Projects*	RP	00	
Indian Knowledge System	IKS	02	
Community Engagement Programme	CEP	02	
Major Total Credits		**116**	
Minor	MIN	24	15.91
Research Methodology	RM	04	
Open Elective/Generic Elective Courses	OE	10	5.68
Indian Knowledge System(Generic)	IKS	02	
Value Education Courses	VEC	04	
Skill Enhancement Courses	SEC	06	4.55
Co-Curricular Courses(NSS/NCC/Sports/Cultural Activities)	CC	02	
TOTAL		**176**	**100%**

a) For 4 year B. Sc. Programme (Honours with Research Degree):

Course Name		Total Credits	% of total credits
Major			
Major Mandatory	MM	72	
Major Elective	ME	16	
Vocational Skill Courses	VSC	06	
On Job Training	OJT	04	
Field Project	FP	02	
Research Projects*	RP	12	
Indian Knowledge System	IKS	02	
Community Engagement Programme	CEP	02	
Major Total Credits		116	
Minor	MIN	24	
Research Methodology	RM	04	
Open Elective/Generic Elective Courses	OE/GE	10	
Ability Enhancement Courses	AEC	08	
Indian Knowledge System(Generic)	IKS	02	
Value Education Courses	VEC	04	
Skill Enhancement Courses	SEC	06	
Co-Curricular Courses(NSS/NCC/Sports /Cultural Activities)	CC	02	
TOTAL		**176**	**100%**

*For honours degree with research, research project is applicable and for honours degree, courses related to major are incorporated.

❖ **Scheme of Teaching and Examination pattern (Theory/Practical/Internal):**

❖ **Structure in Accordance with National Education Policy - 2020 With Multiple Entry and Multiple Exit Options (AEDP)**

- **B.Sc. Part – I (Level-4.5) Semester I**

Course Code	Teaching Scheme			Examination Scheme					
	Theory and Practical			University Assessment (UA)			Internal Assessment (IA)		
	Lectures + Tutorial/ (Hours/ week)	Practical (Hours/ week)	Credit	Maximum Marks	Minimum Marks	Exam. Hours	Maximum Marks	Minimum Marks	Exam. Hours
FP I	2	0	2	30	11	1.5	20	7	1
FC I	2	0	2	30	11	1.5	20	7	1
Lab Course I	0	4	2	30	11	4	20	7	1
FM I	2	0	2	30	11	1.5	20	7	1
HP I	2	0	2	30	11	1.5	20	7	1
Lab Course II	0	4	2	30	11	4	20	7	1
DT I	2	0	2	30	11	1.5	20	7	1
HN I	2	0	2	30	11	1.5	20	7	1
Lab Course III	0	4	2	30	11	4	20	7	1
OE-1 Will be selected from Basket (T)	2	0	2	30	11	1.5	20	7	1
IKS-1	2	0	2	30	11	1.5	20	7	1
TOTAL			**22**	**330**			**220**		

B.Sc. Part – I (Level-4.5) Semester II

Course Code	Teaching Scheme			Examination Scheme					
	Theory and Practical			University Assessment (UA)			Internal Assessment (IA)		
	Lectures (Hours / week)	Practical (Hours/ week)	Credit	Maximum Marks	Minimum Marks	Exam. Hours	Maximum Marks	Minimum Marks	Exam. Hours
FP II	2	0	2	30	11	1.5	20	7	1
FC II	2	0	2	30	11	1.5	20	7	1
Lab Course IV	0	4	2	30	11	4	20	7	1
FM II	2	0	2	30	11	1.5	20	7	1
HP II	2	0	2	30	11	1.5	20	7	1
Lab Course V	0	4	2	30	11	4	20	7	1
DT II	2	0	2	30	11	1.5	20	7	1
HN II	2	0	2	30	11	1.5	20	7	1
Lab Course VI	0	4	2	30	11	4	20	7	1
OE-2 Will be selected from Basket (T)	2	0	2	30	11	1.5	20	7	1
VEC-1	2	0	2	30	11	1.5	20	7	1
TOTAL			**22**	**330**			**220**		
Cum. Total Sem I &II			**44**	**660**			**440**		

- **S#T#–** Subject number Theory paper number
- **S#P#**– Subject number Practical paper number
- **OE# (T)** - Open Elective Theory Paper number
- **OE# (P)** - Open Elective Practical Paper number
- **IKS-1**– Indian Knowledge System Theory Paper 1 (Generic)
- **VEC-1**–Value Education Course (Democracy) Theory

- Total Marks for B.Sc.-I : **1100**
- Total Credits for B.Sc.-I (Semester I & II): 44
- **Requirement for Exit after Level 4.5:**
- **Award of UG Certificate with 44 Credits and an additional 4 credits core NSQF course/Internship.**

❖ **Examination Scheme:** Total marks shall be 50 for 2 credit courses.

1. The question paper in each semester end examination for each theory course (paper) for B.Sc. (all Semesters) shall be of 30 marks for 2 credits.

Total marks for each course shall be based on continuous assessments and semester- end examination. The division of internal assessment and semester–end examination for B. Sc. will be as follows:

Particulars	2 Credit Course	Duration
Semester-end Examination	30 Marks	1.5 Hrs
Internal Assessment	20 Marks	--
Total marks for each course	50 Marks	--

2. The Examination for practical course will be of 50 marks at end of each semester. The rule for practical examination shall be as per the circular/ letter issued by respective board of studies.

3. The examination pattern for Co-Curricular Activities (CC), Field Project (FP), On Job Training (OJT), Community Engagement Program (CEP) and Research Project (RP) as per the University guidelines.

Internal Assessment Process shall be as follows:

(a) The internal assessment should be conducted after completing 50% of syllabus of the course/s.

(b) In case a student has failed to attend internal assessment on scheduled date, it shall be deemed that the student has dropped the test. However, in case of student who could not take the test on scheduled date due to genuine reasons, such a candidate may appeal to the Programme coordinator /Principal /Head of the Department. The Programme coordinator /Principal /Head of the Department in consultation with the concerned teacher shall decide about the genuineness of the case and decide to conduct special test to such candidate on the date fixed by the concerned teacher but before commencement of the concerned semester-end examination. The outline for continuous internal assessment activities shall be as under:

Internal Assessment for 20 Marks (Theory)

B.Sc. (FTM) Part I Semester I & II – 1) Home Assignment = 05 marks

2) Class Assignment (Tutorial type) = 05 marks

3) Quiz = 05 marks

4) Unit Test* = 05 marks

Note: 1) Unit Test shall be conducted after completion of each unit

* Unit Test Instruction: Unit Test shall be conducted after completion of each unit. (e.g For 4 units syllabus, Unit test of 10 marks will be conducted after completion of each unit). A total of 40 marks of 4 midterm tests shall be converted to 10 marks and these marks shall be uploaded on university exam portal under the heading of Unit Test for respective course.

2) Duration of Examination for 30 marks **1 Hour**

Duration of Practical Examination for 50 marks **2 Hours**

Internal Assessment for 20 Marks (Practical)

- **Continuous Internal Evaluation Pattern for Practical based Courses as follows:**

	40 | 20
1. Assessment of Journal	10 | 5
2. Assessment of Regular Notebook	10 | 5
3. Seminar	10 | 5
4. Test based on Practical work (Conduct at least two in each semester)	— 10 | 5

- **Ordinances regarding the examination:** O. B.Sc.2,3 and 4 shall prevail.
- **Equivalence of papers and chances for the students in previous-Semester pattern:** Two additional chances in subsequent semesters shall be provided for the repeater students of old three-year B.Sc. program. In such case the scores obtained by the students in NEP 1.0/CBCS scheme should be converted into equivalent credits in NEP 2.0. After that the students concerned shall have to appear for the examination as per this revised pattern. If a student fails in two consecutive chances, she has to take admission for the respective course in NEP 2.0 (AEDP). In such cases his/her previous performance of incomplete academic years (B. Sc. I, B. Sc. II or B. Sc. III) will be cancelled.

❖ **Equivalence of papers: (Old B. Sc. FTM I & New B. Sc. FTM I)**

	Old Course	**Equivalent Course**	
Sem No.	**Title of Old Course & Credits**	**Title of New Course & Credits**	**Remark/s**
I	Food Preservation-I (02)	Food Preservation-I (02)	Slight modification in syllabus
I	Food Chemistry-I (02)	Food Chemistry-I (02)	Slight modification in syllabus
I	Food Microbiology-I (02)	Food Microbiology-I (02)	Slight modification in syllabus as per industry suggestions
I	Human Physiology -I (02)	Human Physiology -I (02)	Slight modification in syllabus
I	Dairy Technology-I (02)	Dairy Technology-I (02)	Slight modification in syllabus as per industry suggestions
I	Human Nutrition -I (02)	Human Nutrition -I (02)	Slight modification in syllabus
I	Laboratory Course I (02) Laboratory Course II (02) Laboratory Course III (02)	Laboratory Course I (02) Laboratory Course II (02) Laboratory Course III (02)	Change in syllabus as per theory courses, Addition of new practicals as per industry requirements
II	Food Preservation-II (02)	Food Preservation-II (02)	Slight modification in syllabus
II	Food Chemistry-II (02)	Food Chemistry-II (02)	Slight modification in syllabus
II	Food Microbiology-II (02)	Food Microbiology-II (02)	Slight modification in syllabus as per industry suggestions
II	Human Physiology -II (02)	Human Physiology -II (02)	Slight modification in syllabus
II	Dairy Technology-II (02)	Dairy Technology-II (02)	Slight modification in syllabus as per industry suggestions

II	Human Nutrition -II (02)	Human Nutrition -II (02)	Slight modification in syllabus
II	Laboratory Course IV (02) Laboratory Course V (02) Laboratory Course VI (02)	Laboratory Course IV (02) Laboratory Course V (02) Laboratory Course VI (02)	Change in syllabus as per theory courses, Addition of new practicals as per industry requirements

Apprenticeship Embedded Degree Programme

Bachelor of Food Technology and Management (B. Sc. FTM)-Course Structure (As per AEDP)

Credit Framework

First Year

SEM (Level)	COURSE			OE	VSC/ SEC	AEC/ VEC/ IKS	OJT/FP/ CEP/CC/RP	Total Credits	Degree/Cum. Cr. MEME
	Course -1	**Course -2**	**Course - 3**						
SEM I (4.5)	**DSC-I** Food Preservation I (2) **DSC-II** Food Chemistry I (2) **DSC Pract-I** Lab Course I (2)	**DSC-I** Food Microbiology I (2) **DSC-II** Human Physiology I (2) **DSC Pract-I** Lab Course II (2)	**DSC- I** Dairy Technology I (2) **DSC- II** Human Nutrition I (2) **DSC Pract-**I Lab Course III (2)	**OE I-** Will be selected from OE Basket (Th) (2)		**IKS -I** Introduction to IKS (2)	-	**22**	UG Certificate **44**
SEM II (4.5)	**DSC- III** Food Preservation II (2) **DSC-IV** Food Chemistry II (2) **DSC Pract-II** Lab Course IV (2)	**DSC-III** Food Microbiology II (2) **DSC-IV** Human Physiology II (2) **DSC -Pract-II** Lab Course V (2)	**DSC-III** Dairy Technology II (2) **DSC-IV** Human Nutrition II (2) **DSC -Pract-II** I Lab Course VI (2)	**OE- II-** Will be selected from OE Basket (Th) (2)		**VEC-I** Democracy, Election & Constitution (2)	-	**22**	
Credits	**8 (T) + 4 (P) = 12**	**8 (T) + 4 (P) = 12**	**8 (T) + 4 (P) = 12**	**2+2=4**	**-**	**2+2=4**	**-**	**44**	**Exit option: 4 Credits NSQF/Internship/ Skill Courses**

College of Non-Conventional Vocational Courses for Women, Kolhapur
Bachelor of Food Technology and Management-Course Structure (As per AEDP)
Credit Framework
Second Year

SEM Level	COURSES			OE	VSC/SEC	AEC/ VEC/ IKS	OJT/ FP/ CEP/ CC/ RP	Total Credits	Degree/ Cum. Cr. MEME
	Major		**Minor**						
SEM III (5.0)	**Major-V** Cereals, Legumes & Oilseeds Technology I (2) **Major-VI** Fruits and Vegetables Processing Technology I (2) **Major P-III** Lab Course VII (2)	-	**Minor-V** Food Packaging I (2) **Minor-VI** Food Biochemistry I(2) **Minor P-III** - Lab Course VIII (2)	OE-3 Will be selected from OE Basket (T) (2)	**VSC I (P)** Vocational Skill Course in Jam, Jelly & Ketchup Processing Lab Course IX (2) **SEC I (T)** Food Quality and Safety I (2)	**AEC I** English (2)	CC- I (2)	22	**UG Diploma 88**
SEM IV (5.0)	**Major- VII** Cereals, Legumes & Oilseeds Technology II (2) (2) **Major-VIII** Fruits and Vegetables Technology Processing II (2) **Major P-IV** Lab Course X (2)	-	**Minor-III** Food Packaging II (2) **Minor-IV** Food Biochemistry II (2) **Minor P-IV** Lab Course XI (2)	OE-4 Will be selected from OE Basket (T) (2)	**SEC II (T)** Food Quality and Safety II (2)	**AEC II** English (2) **VEC II** Environment Studies (2)	CEP- I (2)	22	
Credits	**8 (T)+4 (P)=12**	**-**	**8 (T) +4 (P) =12**	**2 +2=4(T)**	**4 (T) + 2 (P) =6**	**2+4=6**	**2+2=4**	**44**	**Exit Option: 4 credits NSQF/Internship/ Skill Courses**

College of Non-Conventional Vocational Courses for Women, Kolhapur
Bachelor of Food Technology and Management-Course Structure (As per AEDP)
Credit Framework
Third Year

SEM Level	COURSES			OE	VSC/SEC	AEC/ VEC/ IKS	AEDP	Total Credits	Degree/ Cum. Cr. MEME
	Major		Minor						
SEM V (5.5)	**Major-IX** Bakery and Confectionery (2) **Major-X** Meat, Fish & Poultry Technology (2) **Major P-V** Lab Course XII (4)	**Major I (E)-** 1. Food Additives (2) 2. Beverage Technology (2) 3. Therapeutic Nutrition (2) **Major P-I** - Lab Course XIII (2)	-	OE-5 (T) Will be selected from OE Basket (2)	**VSC II (P)** Vocational Skill Course in Bakery Processing Lab Course XIV (4)	**AEC III** English (4) **IKS II** (2)	-	22	**UG Degree 132**
SEM VI (5.5)	-				**SEC III (T)** Entrepreneurship skills for Food Technologist (2)	-	Apprenticeship (6 months) (20)	22	
Credits	**4 (T)+4 (P)=8**	**2 (T) +2 (P) =4**	**-**	**2 (T/P)**	**2 (T) + 2 (P) =4**	**4+2=6**	**20**	**44**	
Total Credits	**40+20=60**		**24**	**10**	**12**	**16**	**10**	**132**	**Exit Option**

❖ **Standard of Passing:** The standard of passing shall be as per shown in the following table:

	Semester End Exam	**Internal Assessment**	**Course Exam (Total)**
Maximum Marks	30	20	50
Minimum Marks required for passing	11	7	18

1. There shall be a separate head of passing for semester end examination and internal examination.
2. Minimum 18 marks out of 50 are required for passing of practical examination of each course.
3. Passing criteria for Co-Curricular Activities (CC), Field Project (FP), On Job Training (OJT), Community Engagement Program (CEP) and Research Project (RP) as per the University guidelines.

❖ **Gradation Chart:**

% of Marks Obtained	**Numerical Grade (Grade Point)**			**Letter Grade**
Absent	--		-	-
0 – 34	0			F (Fail)
35 – 44	5			C
45 – 54	6			B
55 – 64	7			B+
65 – 74	8			A
75 – 84	9			A+
85 – 100	10			O (Outstanding)

Note:

Marks obtained >= 0.5shall be rounded off to next higher natural number.

1. The SGPA &CGPA shall be rounded off to 2 decimal points.

❖ **Calculation of SGPA& CGPA:**

1. Semester Grade Point Average **(SGPA)**

$$SGPA = \frac{\sum(\text{Course credits} \times \text{Grade points obtained}) \text{ of a semester}}{\sum(\text{Course credits}) \text{ of respective semester}}$$

2. Cumulative Grade Point Average **(CGPA)**

$$\text{CGPA} = \frac{\sum(\text{Total credits of a semester} \times \text{SGPA of respective semester}) \text{ of all}}{\sum(\text{Total course credits}) \text{ of all}}$$

❖ **Result -** The result of each semester shall be declared as Pass or Fail with grade/grade points. However, ATKT rules will be followed as per University guidelines.

❖ **Rules for 60:40 Evaluation Pattern**

❖ **Nature of question paper and scheme of marking:**

a) Theory (Semester exam) for each Theory paper: Maximum marks – 30

Modality of Assessment

Students appearing for the NEP (AEDP) B.Sc. I will be evaluated as per the 60:40 scheme wherein the term end exam will be of 30 marks each paper while 20 marks will be through internal evaluation for each paper.

*A. **Theory Examination***

- ✓ Equal weightage shall be given to all units of the theory paper
- ✓ Total number of questions – 03
- ✓ Question one will carry- 10 Marks,
- ✓ Question No. 1 will be of an objective type. 10 objectives will carry- 10 Marks.
- ✓ Question 2 will be descriptive one question to be attempted out of two and will carry 10 Marks)
- ✓ Question 3 will be short answer type. Two questions are to be attempted out of three questions and will carry 10 Marks, 05 Marks each)
- ✓ **Nature of questions** - multiple choice, Descriptive and short answer type.
- ✓ All these questions will be answered in the same answer book

Semester End Theory Assessment 30 marks

- The duration of this exam will be of 1 and half Hrs (90 minutes)
- For each unit there will be at least one question
- All questions shall be compulsory with internal choice within the questions

Nature of question paper

Total Marks: 30 **Time:** 1 and half Hrs (90 minutes)

Instructions:

1. All questions are compulsory.
2. Figures to the **RIGHT** indicate **FULL MARKS.**

Q.1 Multiple choice questions (10 - Questions)---------- 10 marks

a)

b)

:

:

j)

Q.2 Attempt any **ONE** of the following.

(Essay type / Broad answer questions) ---------- 10 marks

a)

b)

Q.3 Attempt any **TWO** of the following ---------- 10 marks

a)

b)

B. Internal Assessment 40%

Level	Semester	Activities Per Semester	4 credits	2 credits
4.5 (First year)	I & II	1 Home Assignment	10 marks	5 marks
		2 Class Assignment (Tutorial type)	10 marks	5 marks
		3 Quiz	10 marks	5 marks
		4 Unit Test *	10 marks	5 marks
5.0 (Second Year)	III & IV	1 Oral Examination	10 marks	5 marks
		2 Group Discussion	10 marks	5 marks
		3 Seminar	10 marks	5 marks
		4 Unit Test*	10 marks	5 marks
5.5 (Third Year)	V & VI	1 Case Study / Problem solving	10 marks	5 marks
		2 Field Work / Seminar	10 marks	5 marks
		3 Book Review / Poster Presentation	10 marks	5 marks
		4 Unit Test*	10 marks	5 marks
6.0 (Fourth Year)	VII & VIII	1 Seminar	10 marks	5 marks
		2 Case Study/ Problem Solving	10 marks	5 marks
		3 Book Review / Poster Presentation	10 marks	5 marks
		4 Unit Test*	10 marks	5 marks

Note:

1. For two credit course, unit test of 10 marks shall be conducted and it is converted into 5 marks.
2. For four credit course, unit test of 10 marks shall be conducted.
3. Book Review (Any relevant Reference Book)

PRACTICAL EXAMINATION

- There will be semester wise practical examination to be conducted at the end of each semester. The question paper along with marking scheme and skeleton / Question paper will be given by respective BOS before practical examination.
- Total marks -50 for each semester -I and II (will be evaluated by two internal examiners.)
- Total-50 Marks for each semester-III and IV (Major, Minor, VSC and CEP courses will be evaluated by one internal examiner and one external examiner. OE, SEC, CC courses will be evaluated by two internal examiners.)
- Total-50 Marks (2 credit course) for each semester-V and VI (will be evaluated by two external examiners.)
- Total-100 Marks (4 credit course) for each semester-V and VI (will be evaluated by two external examiners)
- External examiners are provided by University. Internal examiners are from respective college fulltime regular faculty. If fulltime regular faculty is not available in college, then principal of the college shall invite internal examiner from fulltime regular faculty appointed in nearby college.

❖ Rules for UG Science (B. Sc.) Programme:

R.B.Sc.No.1

The three-year B. Sc. programme shall consist of 6 semesters which will have 132 credits altogether. However, the candidate who wishes to attempt a Four-Year B. Sc. (Hon./Research) may opt for 4th year which will have 44 credits. Hence, the Four-Year B. Sc. programme will be of 176 credits. (Please refer to the university regulations and structure of the programme for details).

The examination shall be held at the end of each semester.

The theory examination for 2 credits will be of 40 (Semester end examination) and 10 (Internal examination) marks. The practical examination for 2 credits will be 50 marks at the end of each semester.

R.B.Sc.No.2

Structure of B. Sc. programme is as shown in Annexure 1.

R. B. Sc. No.3

List of Courses:

	Sem I	• Subject I: DSCI, DSCII, and Practical I • Subject II: DSC I, DSC II, and Practical I • Subject III: DSC I, DSC II, and Practical I • OE I (Theory/ Practical) • IKS I (Introduction to IKS)
B. Sc. I	**Sem-II**	• Subject I: DSCIII, DSCIV, and Practical II • Subject II: DSCIII, DSCIV, and Practical II • Subject III: DSCIII, DSCIV, and Practical II • OE II (Theory/ Practical) • VEC I (Democracy, Election and constitution)
B. Sc. II	**Sem III**	• Major V, VI, and Major Practical III • Minor V, VI, and Minor Practical III • OE III (Theory/ Practical) • VSC I Practical (Major Specific) • SEC I Theory/Practical • AEC I (English) • CC
	Sem IV	• Major VII, VIII, and Major Practical IV • Minor VII, VIII, and Minor Practical IV • OE IV (Theory/ Practical) • SEC II Theory/Practical • AEC II (English) • VEC II (Environmental Studies) • CEP

	Sem V	• Major IX, X, and Major Practical V, VI • Major I (Elective), Major (Elective) Practical- I • OE V (Theory/ Practical) • VSC II Practical II Major Specific • AEC III (English) • OJT
B. Sc. III	**Sem VI**	• Major XI, XII, and Major Practical VII, VIII • Major II (Elective), Major (Elective) Practical- II • VSC III Practical Major Specific • SEC III Practical • AEC IV(English) • IKS II (Major Specific) • FP

R. B. Sc. No. 4

(A) Skill Enhancement Course (SEC):

Skill Enhancement Course should be selected from the basket provided by University.

(B) **Open Elective Course (OE):** Open Elective **Course should be selected from the basket provided by University.** This course is to be chosen compulsorily from faculty other than that of major or Geography or Mathematics or Statistics from OE basket.

(C) **Co-curricular Courses (CC):** For Semester III one Co-curricular course such as Health and Wellness/ Yoga education / sports and fitness / Cultural Activities/ NSS / NCC / Fine Arts / Applied Arts / Visual Arts / Performing Arts is to be chosen compulsorily. The student should be engaged for four hours per week. The examination pattern will be decided by the respective bodies.

(D) On Job Training (OJT):

The candidate should complete the work of **On Job Training of 4 credits in Semester V.** The execution of OJT examination pattern shall be as per the OJT guidelines of the University.

On-job training (OJT)/ Internship/ Apprenticeship of 120 hours must be completed by the candidate in industry/ health sectors / research labs/ public testing laboratories

/ diagnostic laboratories/ Chemical Industry / Pharmaceutical Industry.

(E) **Field Project (FP):** The guidelines and examination pattern will be decided by the respective board of studies.

R. B. Sc. No. 5

The student must earn at least 60% of the credits from his/her mother institute. The students may earn at the most 40% of the credits in any head, except major related courses and minor courses through online mode approved by the University.

R. B. Sc. No. 6

The fees for the admission to B. Sc. Part I, B. Sc. Part II, B. Sc. Part III and B. Sc. Part IV Programme shall be as prescribed by the University from time to time.

R. B.Sc. No. 7

Detailed Syllabus:

The detailed syllabi for the various courses under this pattern shall be subject to such revision, modification etc. as may be made by the Academic council from time to time on the recommendations of the Board of Studies in different subjects. The textbooks and reference books for the various courses shall be those prescribed by the Academic Council from time to time on the recommendations of the respective Boards of Studies.

R. B. Sc. No. 8

The medium of instruction: For the Three Year (Six Semesters) B.Sc./ Four Year B.Sc. Degree Programme. The medium of instruction for Major, Minor, VSEC, SEC, and AEC is English. The medium of instruction for OE, CEP, CC, OJT, FP, VEC and IKS may be either Marathi or English.

R. B. Sc. No. 9

i. In B. Sc. Part II, the student can choose any one subject as major subject, one subject as minor subject from the three subjects (Discipline Specific Core) studied in B.Sc. Part I.

ii. The student will continue for B. Sc. Part III with the major subject he/ she opted in B. Sc. Part II.

R. B. Sc. No. 10 Multiple Entry and Multiple Exit (MEME):

- If an exited student wants to reenter, he/she can reenter within three years from exit.
- One should complete his/ her degree program within a period of a maximum of seven years.

R. B. Sc. No. 11

No candidate shall be allowed to appear the B. Sc. Part-III (or Three- Year Undergraduate Degree in Science) Examination unless the candidate has satisfactorily kept two terms for the programme at a college affiliated to/ university department of this University or any other recognized university.

The principal of the college has to certify the attendance and the examination form of the candidate as per Ordinance O 31 and O 37. A candidate has to submit the University examination form as per the schedule and dates prescribed by the University for every examination to the University along with the prescribed fee through the Principal of the College.

R. B. Sc. No. 12

The Scheme of Physical Education has been made operative for B. Sc. Part-I. The students will get a maximum of 10 Marks after completing the Physical Education Tests conducted by the University authorities. The benefit of marks, obtained by the students shall be as under:

1. If a student fails in up to four courses (of two credits each) of passing of the University examination (Theory/Practical) and has passed in all the remaining heads, the marks obtained by him / her in the Physical Education Test shall be added to maximum upto four courses (of two credits each) for passing in which he has failed as the case may be.
2. A student getting the benefit of Physical Education marks should not be given advantage of any other Ordinance. The Physical Education Marks

   shall not be considered for the award of Class and for deciding merit.
3. If as a result of the addition of Physical Education marks a student does not pass the examination the marks obtained by him / her in Physical Education shall not be considered.
4. If a student is failing in more than four courses (of two credits each) the marks of the physical education test should not be added to any head.
5. The marks of Physical Education obtained by the unsuccessful students at the B.Sc. Part-I semester Examination shall be carried forward for their subsequent

attempt/s.

6. The marks obtained in Physical Education shall not be considered for earning exemption in a subject of head of passing, but the marks will be carried forward for availing the benefit at the subsequent attempts.
7. The marks secured by the students under the Physical Education scheme, if not used for promotion, shall be added to the total of his marks in the examination irrespective of the fact of his passing or failure in the examination. The Physical Education marks shall be shown as ―Total + P. E. Marks‖.
8. The Physical Education Test shall be conducted in the second semester.
9. The student can avail the benefit of marks of test of physical education only once in his three-year degree course.

R. B. Sc. No. 13

All Semester-end theory and practical examinations for B.Sc. Part I (Sem I and II), B.Sc. Part II (Sem II and IV), B.Sc. Part III (Sem V and Vi), B.Sc. Part IV (Sem VII and VIII) shall be held twice (i.e. April /May and October/November) a year.

R. B. Sc. No. 14

a) A candidate who desires to seek a B. Sc. Degree in another Major course (DSE or ME), shall be permitted to do so. Selected major subject should be studied as Minor subject at level 5.0. Such candidate may appear at B.Sc. Part III (Semester V & VI) Examination on the submission of a new application for fresh admission and on payment of required fees. Such a candidate need not appear again for AEC and OE courses.

b) The Candidate as above (in clause „a‟) shall not be eligible for a second degree and a class, a prize, scholarship, medal, or any other award. The candidate will get the benefit of a new degree in a newcourse (subject) only if the candidate surrenders his first degree.

c) A candidate seeking degree in a specific course (subject) not offered at B.Sc. Part

II and III, but offered only at B.SC. Part I, needs to reappear for B.Sc. Part II (Sem

III and IV) and Part III (V and VI), including both theory and practical. Such a candidate passing the examination shall not be eligible for class or additional degree. He shall be granted a certificate of having passed the additional subject. The candidate shall get new degree provide they surrenders his first degree.

R. B. Sc. No. 15

a) The result of the B.Sc. Part I (semester I and II) examinations shall be declared publicly in three categories

(i) Pass: Candidates who have passed the B.Sc. Part I (semester-I and II) examination.

(ii) Fail - ATKT: Candidates who are allowed to proceed to the B.Sc. Part II (semester-III).

(iii) Fail: Candidates who are failed to proceed to the B.Sc. Part II (semester-III).

b) The result of the B. Sc. Part II (semester III and IV) examinations shall be declared publicly in three categories.

(i) Pass: Candidates who have passed the B.Sc. Part II (semester-III and IV) examination in addition to the remaining courses, if any of privies examination.

(ii) Fail - ATKT: Candidates who are allowed to proceed to the B.Sc. Part III (semester-V).

(iii) Fail: Candidates who are failed to proceed to the B.Sc. Part III (semester-V).

c) If a candidate fails or remains absent in examination of all the courses of semester-I or not applied for semester I examination (provided he/she attended semester I) shall be allowed to proceed to semester II.

d) If a candidate fails or remains absent in examination of all the courses of semester-III or not applied for semester III examination (provided he/she attended semester III) shall be allowed to proceed to semester IV.

e) If a candidate fails or remains absent in examination of all the courses of semester-V or not applied for semester V examination (provided he/she attended semester V) shall

be allowed to proceed to semester VI.

f) No candidate shall be allowed to proceed to semester-V unless the candidate has cleared semester-I and semester-II in all courses.

g) No candidate shall be allowed to proceed to semester-VII unless the candidate has cleared all previous semesters from –I to VI in all courses with a minimum 7.5 CGPA (or 75 % Marks).

h) If a candidate fails or remains absent in examination of all the courses of semester-VII or not applied for semester VII examination (provided he/she attended semester VII) shall be allowed to proceed to semester VIII.

i) Rules of ATKT made by the University will be applicable from time to time.

R. B. Sc. No. 16

(A) The Results of the Examination will be declared based on marks obtained, Grade points obtained, Credit points, Status, Percentage of marks, Result, SGPA and CGPA with numerical grade points, and letter grades. The list of Courses, course codes, Paper numbers of programme, numerical grade & letter grade table, and calculation of SGPA and CGPA table shall be mentioned on the backside of the mark sheet.

(B) In the case of a Three-Year B. Sc. Degree, the result of B. Sc. programme (Semester-I to VI) shall be declared in Grades by considering SGPA and CGPA (with percentage) based on the performances of all the courses at respective semesters. The award of scholarships and prizes for the B.Sc. programme shall be determined based on the aggregate performance of the candidate at the semester-I to VI examination.

(C) In the case of a Four-Year B. Sc. Degree, the result of B. Sc. programme (semester-I to VIII) shall be declared in grades by considering SGPA and CGPA (with percentage) based on the performances of all the courses at respective semesters. The award of scholarships and prizes for the B.Sc. programme shall be determined based on the aggregate performance of the candidate at the semester-I to VIII examination.

R. B. Sc. No. 17

Standard of Passing:

A) To pass the three-year B.Sc. degree examination, a candidate shall be required to pass in semester I, II, III, IV, V and VI examinations

a) To pass each semester examination a candidate shall be required to obtain a minimum of 35% of the total marks in each course.

b) A Candidate shall have to obtain 11 marks out of 30 for the semester end theory examination, 18 out of 50 for the semester end practical examination and 7 marks out of 20 in the internal examination in each semester. If the candidate fails/ absent in the internal examination then the candidate has to pass the internal examination as per University regulations.

c) The candidate has to complete the other applicable courses like VSEC, SEC, VEC, AEC OE, IKS, CC, OJT, CEP and FP according to the criterion applicable for the respective courses.

B) For Three year B. Sc Degree : Those of the successful candidates who obtain 45% or more of the aggregate marks in Parts-I, II& III semester Examinations, (i.e. Semester-I to VI aggregate) shall be declared to have passed the B.Sc. Degree Examinations in Second Class and those obtaining 60% or more of the aggregate marks in Parts-I, II & III Examinations (i.e. Semester-I to VI aggregate) shall be declared to have passed the B.Sc. Degree Examinations in First Class and those obtaining 70% or more of the aggregate marks in Parts-I, II & III (i.e. Semester I to VI aggregate) shall be declared to have passed the B.Sc. Degree Examination in First Class with Distinction.

C) For Four Year B. c. with (Hon./Research) Degree: Those of the successful l candidates who obtain 45% or more of the aggregate marks in Parts-I, II, III & IV Semester Examinations, (i.e. Semester-I to VIII aggregate) shall be declared to have passed the B.Sc. with (Hon./Research)Degree Examinations in Second Class and those obtaining 60% or more of the aggregate marks in Parts-I, II, III & IV Semester Examinations, (i.e. Semester-I to VIII aggregate) shall be declared to have passed the B.Sc. with (Hon./Research) Degree Examinations in First Class and those

obtaining70% or more of the aggregate marks in Parts-

I, II, III & IV Semester Examinations, (i.e. Semester-I to VIII aggregate) shall be declared to have passed the B.Sc. with (Hon./Research) Degree Examination in First Class with Distinction.

R. B. Sc. No. 18

A candidate who has satisfactorily completed all courses at Semester-I of B. Sc. Part I of the Universities in the State of Maharashtra shall be allowed to join for the Semester II of the B.Sc. Part I in this university. However, a candidate who has satisfactorily kept one term in any of the Universities in the State of Maharashtra for B. Sc. Part I Semester-I examination shall not be allowed to join for the Semester II of the B.Sc. Part I in this university unless and until the candidate has to clear all the courses (papers) of Semester-I from that university

R. B.Sc. No. 19

a) A candidate passing B.SC. Part-I (Sem I and Sem II) Examinations of the B.Sc. Degree programme of other Statutory Universities in State of Maharashtra can take admission to next semester of Shivaji University and the marks of earlier semesters of previous Statutory University be converted in proportion to Shivaji University, Marks structure and grades be awarded accordingly.

(b) Multiple entry and exit rules as per university Regulations and Academic Bank of Credit Regulations are applicable.

R.B. Sc. 20

Relevant amendments in the rules and regulations as per the guidelines notified by UGC/University shall be applicable.

Semester I

Food Preservation –I (DSC I)

Credits 2

Course Outcomes: Upon successful completion of this course, the student will be able

1. To understand the basic principles of food preservation.
2. To know basic principles of several food processing and preservation methods.
3. To study about food spoilage.

Unit I 15 Lectures

❖ **Principles of Food Preservation**

- Introduction and Definition of Food Preservation
- Importance and Need of Food Preservation
- Principles of Food Preservation

❖ **Food Spoilage**

- Introduction
- Undesirable Changes in Food due to Spoilage
- Factors Affecting food Spoilage
- Types of Spoilage
- Effect of Spoilage on Nutritional Quality of food

❖ **Traditional Methods of Food Preservation**

- Smoking
- Sun drying
- Pickling/ Salting
- Fermentation

Unit II 15 Lectures

❖ **Preservation using Fermentation**

- Theory and Equipment
- Benefits and mechanisms of fermentation
- Fermented food products e.g. Beer, Wine, Soya sauce, Cheese, Soya bean products
- Microbial vs Industrial Fermentation
- Effect of fermentation on Foods.

❖ **Preservation using High temperature**

- Moist and Dry heat methods
- Thermal death time – (D-value, Z-value, F-value)
- Boiling
- Blanching
- Dehydration and Concentration
- Canning
- Pasteurization
- Extrusion

Reference Books:

1. Potter (1996) Food Science, CBS publication & distribution, New York, 235, 432
2. B. Shrilakshmi (2001) Food Science, New Age International (P) Limited Publication
3. N. Shakuntala Manay, M. Shadaksharswamy (2008) Food Facts& Principles, New Age International (P) Limited Publication
4. G. Subbulakshmi, Shobha A Udipi (2001) Food Processing and Preservation, New Age International (P) Limited Publication
5. P.J. Fellow (2005) Food Processing Technology, Woodhead Publication Pvt Ltd.
6. Virag Gupta Food Safety & Standards Act 2006, Rules 2011, Regulations (2021), Commercial Law Publication (India) Pvt Ltd.
7. Norman Desrosier Technology of Food processing (1987), CBS publication & distribution.

Semester I

Food Chemistry –I (DSC II)

Credits 2

Course Outcomes: Upon successful completion of this course, the student will be able

1. To understand the properties of carbohydrates, lipids, and their reactions during storage and processing of food.
2. To know the importance of water in the food industry
3. To study the role of vitamins in the human body.

Unit I — 15 Lectures

❖ **Water**

- Forms of water present in food.
- Water activity and ERH,
- Role of water activity in food spoilage, sorption isotherm theory.
- Physico-chemical, biological water quality parameters.
- Role of water in food industry.

❖ **Carbohydrates**

- Definition, classification, structural, physical and chemical properties
- Applications of carbohydrates in food preparation
- Dietary fibres, Sugar alcohols
- Gums and pectic substances

Unit II — 15 Lectures

❖ **Lipids**

- Definition, classification of fatty acids.
- Classification of lipids.
- Physical and chemical properties of fats and oils.
- Spoilage of fat.
- Quality tests to check purity of fats/oils
- Applications of fats/oils in food preparation.

❖ **Vitamins**

- Definition and classification vitamins.
- Functions, deficiency, excess and sources of fat-soluble vitamins and water-soluble vitamins. Effect of processing on vitamins.

Reference Books:

1. Sukhneet Suri and Anita Malhotra (2014), Food Science, Nutrition and Safety, Dorling Kindersley (India) Pvt. Ltd, Pearson.
2. Sunetra Roday (2018), Food Science and Nutrition, 3rd Edition, Oxford University Press, New Delhi.
3. Fennema and Owen R (1996), Food Chemistry, 3rd edition, Marcell Dekker, New York.
4. DeMan J M (1980), Principles of Food Chemistry, AVI, New York.
5. N. Shakuntala Manay and M. Shadaksharswamy (2008), Food Facts and Principles, New Age International (P) Limited.
6. U. Satyanarayana and U. Chakrapani (2017), Biochemistry, 5th edition, Elsevier Relx India Pvt. Ltd.

Laboratory Course - I (DSC Practical I)

Credits 2

Group A: Food Preservation I

1. Methods for Blanching Vegetables
2. Food Preservation by salt
3. Food preservation by sugar
4. Food Preservation by oil
5. Food preservation by Natural Drying Methods
6. Food preservation by Mechanical dehydration Method

Group B: Food Chemistry I

1. Introduction to laboratory instruments.
2. Preparation of lab solution
3. Browning effect of fruits and vegetables
4. Effect of heat on fruits and vegetables.
5. Effect of acid and alkali on colour of fruits and vegetables.
6. Effect of sugar on boiling point of water.
7. Qualitative tests for carbohydrates.

Semester I

Food Microbiology –I (DSC I)

Credits 2

Course Outcomes: Upon successful completion of this course, the student will be able

1. To gain knowledge about the basics of microbiology.
2. To learn several staining techniques.
3. To understand the concept of genetic engineering.

Unit I: 15 Lectures

❖ Introduction to Microbiology

- Definition of Microbiology,
  - Important contributions of various scientists,
  - Classification of microorganisms,
  - Morphology of bacteria: Size, Shape, and Arrangements.
  - Cytology of bacteria- the structure of typical bacterial cell, structure and functions of bacterial 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,
- Culture methods- Isolation techniques: Streak plate, pour plate, and Spread plate.

Unit II: 15 Lectures

❖ 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,
- Steps in Gene Cloning,
- Vectors used in Recombinant Technology,
- Genetically Modified Foods, Advantages & Disadvantages of GM Foods.

Reference Books:

1. R. Ananthanarayan, C.K. Jayram Paniker (2001), Orient Longman Ltd.
2. James M. Jay (1987), Modern Food Microbiology, CBS Publishers and Distributors.
3. S. P. Narang (2016), Food Microbiology, APH Publishing Corporation.
4. Sinha U. (1994), An Introduction to Bacteria, Vikas Publishing House Pvt. Ltd.
5. Bibek Ray, Arun Bhunia (2018) Fundamental Food Microbiology 5th Edition, CRC Press.
6. Kanika Sharma (2007) Manual of Microbiology Tools and Techniques 2nd Edition.
7. Dr. G. L. Bhoosreddy, Dr. B.J. Wadher, Dr. A.V. Gomashe, Dr. Mrs. K.V. Dubey (2014) Industrial Microbiology, Himalaya Publishing House.
8. Michael Pelczar.Jr.,E.C.S. Chan, Noel R. Krieg (1996) Microbiology, Tata MacGraw Hill Publishing Company Limited, New Delhi.
9. S.S. Purohit (2001) Microbiology Fundamentals and Applications 6th Edition, Agrobios.
10. B.D. Singh (2006), Biotechnology, Kalyani Publishers.
11. Dr. M.G. Bodhankar, Mrs. Tripti Bapat, Mrs. N.S. Joshi (2003), Phadke Prakashan.
12. R.C. Dubey, A Textbook of Biotechnology, S.Chand Publication.

Semester I

Human Physiology –I (DSC II)

Credits 2

Course Outcomes: Upon successful completion of this course, the student will be able

1. To gain knowledge about the composition and functions of Blood.
2. To understand the functions of important physiological systems such as cardiovascular and respiratory systems.
3. To understand the functions of respiratory system and concept of lung volumes.

Unit I — 15 Lectures

- **Blood**
  - Functions of Blood,
  - Composition of Plasma,
  - Structure and functions of RBC,
  - WBC,
  - Platelets and Haemostasis
- **Lymphatic system**
  - Formation of Lymph,
  - Organs of lymphatic system
  - Functions of lymphatic system

Unit II — 15 Lectures

- **Cardiovascular System**
  - Structure and functions of Heart,
  - Types of blood circulation
  - cardiac cycle, Heart Rate, Stroke volume, Cardiac output,
  - Blood Pressure and Factors affecting Blood pressure
- **Respiratory System**
  - Organs of respiratory system and their functions.
  - Mechanism of respiration, External respiration, Internal respiration,
  - Lung Volumes and capacities

Reference Books:

1. Chatterjee C.C (2022), Human Physiology, Volume I and II,14th edition, CBS Publishers and Distributors Pvt. Ltd.
2. Joshi Vijaya D (2018), Preparation Manual for Undergraduates Physiology,6th edition Elsevier.
3. Prof. A. K Jain, (2017), Textbook of Physiology Vol I and II, Avichal Publisher Company.
4. Indu Khurana, Arushi (2015), Textbook of Anatomy and Physiology for Nurses and Allied Health Sciences 1st edition, CBS Publishers and Distributors Pvt. Ltd.

Laboratory Course - II (DSC Practical I)

Credits 2

Group A: Food Microbiology I

1. Study of Compound Microscope
2. Demonstration, Construction & Working of Laboratory equipment
3. Study of different ingredients of culture media
4. Preparation of Peptone water
5. Preparation of General Purpose Media

Group B: Human Physiology I

1. Different methods of Collection of Blood.
2. Peak Flow value measurement
3. Determination of Pulse rate
4. Determination of Bleeding Time
5. Determination of Clotting Time
6. Determination of Blood Group
7. Determination of Blood Pressure

Semester I

Dairy Technology–I (DSC I)

Credits 2

Course Outcomes: Upon successful completion of this course, the student will be able

1. To understand the technology behind the production of various dairy products.
2. To impart skills in the application of biological, chemical, biochemical, physical and engineering sciences in processing and preservation of milk and milk products.
3. To gain in-depth knowledge of different processing techniques used in the dairy industry, such as pasteurization, sterilization, homogenization, and concentration.

Unit I — 15 Lectures

- **Market Milk**
  - Introduction & Definition
  - Chemical composition & Nutritive value
  - Factors affecting the 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 Milk**
  - Introduction and Types of special milk- Definition, Standards, Processing & Uses
  - Sterilized Milk
  - Homogenized Milk
  - Flavored Milk
  - Fermented Milk- 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

Unit II 15 Lectures

❖ **Dried Milk**

- 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 Milk**

- 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

Reference Books:

1. S. De (1997), Outline of Dairy Technology, Oxford University Press.
2. T. M. Cogan (1995), Dairy Starter Cultures, VCH publishers.
3. P. Gangasagare (2018), Textbook of Traditional Dairy Products, Oxford Book Company.

4. B.K. Mishra (2016), Dairy and Food Product Technology, Biotech Books.
5. M. Kango (2006), Milk & Milk Products, RBSA publishers.
6. R. K. Robinson, Modern Dairy Technology Vol. I and II: Advances in Milk, Springer Science Business Media.
7. D. D. Patange (2005), Textbook on Milk and Milk Products, Jaya Publishing House.
8. S. K. Singh (2016), Analysis of Milk Chemistry, Oxford Book Company, Jaipur.
9. A.R. Johnson, B.H. Webb (1987), Fundamentals of Dairy Chemistry, CBS Publishers & Distributors,New Delhi.
10. C.H. Eckles, W.B. Combs (1997), Milk & Milk Products, Tata McGraw Hill Publishing Company.
11. P. Gangasagare,(2016), Processing of Milk, Agrotech Press, Jaipur.

Semester I

Human Nutrition–I (DSC II)

Credits 2

Course Outcomes: Upon successful completion of this course, the student will be able

1. To understand the functions and sources of nutrients, role of nutrients in maintenance of good health.
2. To gain knowledge about food pyramid, vegetarian diet, menu planning and nutritional needs during infancy to adolescents.
3. To develope skills in planning therapeutic diets for individuals with specific health conditions and providing nutritional counseling.

Unit I — 15 Lectures

- **Introduction to Human Nutrition**
  - Definitions- Nutrition, Nutrients, Nutritional status, Health, Malnutrition
  - Classification of Nutrients
  - Factors affecting Food consumption and Nutritional status
  - Balanced Diets
  - Recommended Dietary Allowances, Food Exchange List
  - Food Pyramid, Planning Diets
- **Diets for adult**
  - Nutritional Requirements
  - Food Requirements

Unit II — 15 Lectures

- **Diets during Infancy**
  - Growth and development during infancy
  - Nutritional and food Requirements
  - Artificial Feeding
  - Low Birth weight baby
  - Pre-term baby
  - Weaning
- **Diets for Pre-school children (1 to 6 years)**
  - Nutritional Requirements
  - Protein Energy Malnutrition
  - Feeding Programs

Reference Books:

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.
8. Textbook of Human Nutrition by (Late) Anjana Agarwal and Shobha Udipi

Laboratory Course – III (DSC Practical I)

Credits 2

Group A: Dairy Technology I

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, Cane sugar & Starch
7. Methylene Blue Reduction Time & Resazurin Test
8. Total solids & S.N.F of Milk
9. Preparation of Dahi & Mishti Dahi

Group B: Human Nutrition I

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 Fiber rich dish

Semester I

Open Elective – I (OE - 01) Credits 2

OE will be selected from basket as per regular B. Sc. Structure.

Semester I

IKS Credit 2

Introduction to Indian Knowledge System

Syllabus will be as per regular B. Sc. Structure.

Semester II
Food Preservation – II (DSC III)
Credits 2

Course Outcomes: Upon successful completion of this course, the student will be able

1. To understand the concept of food preservatives and the preservation techniques used to avoid it.
2. To understand recent advanced technology used in food processing.
3. To understand the effect of preservation techniques on food.

Unit I — 15 Lectures

❖ **Preservation using Low Temperature**

- Introduction and Definition
- Effect of cold temperature on microorganisms
- Methods of low-temperature preservation
- Cellar Storage, Refrigeration and Freezing
- Types of Freezing
- New development in Freezing
- Effect of freezing on foods and microorganisms

❖ **Preservation by Food additives**

- Introduction to additives
- Functions, Need & Safety
- Types of Food Additives
- Mode of Action and Applications
- Class I Preservatives (Natural)
- Class II Preservatives (Artificial)

Unit II — 15 Lectures

❖ **Recent advances methods of food preservation**

- Pulsed electric field processing
- Ohmic heating, Dielectric heating, Infrared heating
- High Pressure Processing
- Processing using UV light
- Processing using Ultrasound
- Hurdle Technology and its applications

Reference Books:

1. Potter, N.N. and Hotchkins, J.H. (1996) Food Science. C.B.S Publishers, New York, 235, 432
2. G Subbulaksmi, Shobha A Udipi, Padmini S Ghugre (2022) Food processing and preservation 2nd edition, New Age International (P) Limited Publication
3. B. Shrilakshmi (2001) Food Science, New Age International (P) Limited Publication
4. N. Shakuntala Manay, M. Shadaksharswamy(2008) Food Facts& Principles, New Age International (P) Limited Publication
5. G. Subbulakshmi, Shobha A Udipi(2001) Food Processing and Preservation, New Age International (P) Limited Publication
6. P.J.Fellow(2005) Food Processing Technology, Woodhead Publication Pvt Ltd.
7. Virag Gupta Food Safety & Standards Act 2006, Rules 2011, Regulations (2021), Commerical Law Publication (India) Pvt Ltd.
8. Norman Desrosier Technology of Food processing (1987), CBS publication & distribution

Semester II
Food Chemistry – II (DSC IV)
Credits 2

Course Outcomes: Upon successful completion of this course, the student will be able

1. To understand the properties of proteins and their reactions during storage and processing of food.
2. To know the importance of minerals in the human body and the effect of processing on it.
3. To understand colour and flavour factors in the food industry.

Unit I 15 lectures

❖ **Proteins**

- Definition, and classification of amino acids and proteins.
- Structural, and chemical properties,
- application of proteins in food preparation.

❖ **Minerals**

- Definition, and classification of minerals.
- Functions, deficiency, excess, and sources of macro and micro minerals.
- Effect of processing on minerals.

Unit II 15 lectures

❖ **Colour**

- Classification,
- colour pigments,
- colour evaluation system.

❖ **Flavour**

- Introduction to flavours, basic tastes, taste inhibition and modification.
- Taste factors, flavours of some food.
- Aroma compounds and extraction.

Reference Books:

1. Sukhneet Suri and Anita Malhotra (2014), Food Science, Nutrition and Safety, Dorling Kindersley (India) Pvt. Ltd, Pearson.
2. Sunetra Roday (2018), Food Science and Nutrition, 3rd Edition, Oxford University Press, New Delhi.
3. Fennema and Owen R (1996), Food Chemistry, 3rd edition, Marcell Dekker, New York.
4. DeMan J M (1980), Principles of Food Chemistry, AVI, New York.
5. N. Shakuntala Manay and M. Shadaksharswamy (2008), Food Facts and Principles, New Age International (P) Limited.
6. U. Satyanarayana & U.Chakrapani(2017),Biochemistry,5th edition,Elsevier Relx India Pvt. Ltd.

Laboratory Course - IV (DSC Practical II)

Credits 2

Group A: Food Preservation II

1. Food preservation by Mechanical Methods.
2. Rehydration Test for the Dried Samples.
3. Food preservation by use of Food preservative.
4. Food preservation by use of fermentation method.

Group B: Food Chemistry II

1. Isolation of starch from potato.
2. Isolation and characterization of casein.
3. Gelatinization of food starch.
4. Smoke point of fats and oils.
5. Acid value of fats/oils.
6. Qualitative tests for proteins.

Semester II

Food Microbiology – II (DSC III)

Credits 2

Course Outcomes: Upon successful completion of this course, the student will be able

1. To gain knowledge of spoilage of various food commodities by micro-organisms.
2. To gain knowledge of microbiology of water
3. To gain knowledge of Food-Borne illness and toxic infections.

Unit I **15 Lectures**

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.

Unit II 15 Lectures

❖ **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.

- **Food Fermentations**
- Role of micro-organisms in fermentation
- Probiotics – Definition and Importance, Yogurt Production,
- Fermented Meat & Fish Products – Sausages, Fermented Fish,
- Fermented Fruit & Vegetable Products – Sauerkraut, Kimchi, Vinegar, Citric acid, Fermented Cereal Products – Miso, Soy Sauce, economically important fermented foods – Wine.

Reference Books:

1) W.C. Frazier (2016), Food Microbiology, Tata MacGraw Hill Publishing Company Limited.
2) Dr. Chand Pasha, Dr. A. Madhuri, Dr. P. Muthenna, Dr. T. Raga Sudha (2020), Food Microbiology, Divya Lakshmi Publishers and Distributors.
3) Bibek Ray, Arun Bhunia (2018), Fundamental Food Microbiology 5th Edition, CRC Press.
4) L. E. Casida Jr. (2019), Industrial Microbiology 2nd Edition, New Age International Publishers.
5) M. R. Adams, M.O. Moss (2015), Food Microbiology, New Age International Publishers.
6) James M. Jay (1987), Modern Food Microbiology, CBS Publishers and Distributors.
7) Dey S. (1994), Outlines of Dairy Technology. Oxford Univ. Press. New Delhi, 1994.

Semester II

Human Physiology – II (DSC IV)
Credits 2

Course Outcomes: Upon successful completion of this course, the student will be able

1. To understand the functions of important physiological systems such as the digestive system.
2. To understand the functions of important physiological systems such as endocrine and nervous systems.
3. To understand the regulation of body metabolism through endocrine system.

Unit I — 15 lectures

- **Digestive system**
  - Parts of the Digestive system- Structure and their functions
  - Liver and Pancreas -Structure and functions,
  - Absorption of digested food
- **Excretory system**
  - Parts of the Urinary system and their functions
  - Physiology of Urine formation

Unit II — 15 lectures

- **Nervous system**
  - Structure and functions of brain and Spinal cord,
  - Peripheral Nervous system
  - Reflex action,
  - Neurotransmitters.
- **Endocrine system**
  - Endocrine Glands,
  - Functions and related disorders.

Reference Books:

1. Chatterjee C.C (2022), Human physiology, Volume I and II,14th edition, CBS Publishers and Distributors Pvt. Ltd.
2. Joshi Vijaya D (2018), Preparation Manual for Undergraduates Physiology,6th edition Elsevier.
3. Prof. A. K Jain (2017), Textbook of Physiology Vol I and II, Avichal Publisher Company.
4. Indu Khurana, Arushi (2015), Textbook of Anatomy and Physiology for Nurses and Allied Health Sciences 1st edition, CBS Publishers and Distributors Pvt. Ltd.

Semester II

Laboratory Course - V (DSC Practical II)

Credits 2

Group A: Food Microbiology II

1. Isolation of micro-organisms from soil
2. Enumeration of total viable count of bacteria from milk
3. Preparation of Potato, Dextrose Agar for Yeast, Molds & Fungi
4. Determination of Fungal & Yeast count in a given food sample
5. Simple staining of bacterial cultures
6. Gram staining of bacteria

Group B: Human Physiology II

1. Estimation of Haemoglobin
2. Study of the respiratory system
3. Determination of Total WBC count
4. Determination of specific gravity of Urine
5. Study of the Digestive system
6. Study of the Urinary system
7. Normal Urine Analysis
8. Abnormal Urine Analysis

Semester II

Dairy Technology II (DSC III)

Credits 2

Course Outcomes: Upon successful completion of this course, the student will be able

1. To know about process involved in processing of various fat rich dairy products.
2. To provide knowledge regarding commercial production of cheese & ice-creams.
3. To assess the quality of milk and milk products using various methods, including chemical, physical, and microbiological analysis.

Unit I — 15 Lectures

- **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

Unit II — 15 Lectures

- **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

Reference Books:

1. S. De (1997), Outline of Dairy Technology, Oxford University Press.
2. T. M. Cogan (1995), Dairy Starter Cultures, VCH publishers.
3. P. Gangasagare (2018), Textbook of Traditional Dairy Products, Oxford Book Company.
4. B.K. Mishra (2016), Dairy and Food Product Technology, Biotech Books.
5. M. Kango (2006), Milk & Milk Products, RBSA publishers.
6. R. K. Robinson, Modern Dairy Technology Vol. I and II: Advances in Milk, Springer ScienceBusiness Media.
7. D. D. Patange (2005), Textbook on Milk and Milk Products, Jaya Publishing House.
8. S. K. Singh (2016), Analysis of Milk Chemistry, Oxford Book Company, Jaipur.
9. A.R. Johnson, B.H. Webb (1987), Fundamentals of Dairy Chemistry, CBS Publishers & Distributors,New Delhi.
10. C.H. Eckles, W.B. Combs (1997), Milk & Milk Products, Tata McGraw Hill Publishing Company.
11. P. Gangasagare,(2016), Processing of Milk, Agrotech Press, Jaipur.

Semester II

Human Nutrition II (DSC IV)

Credits 2

Course Outcomes: Upon successful completion of this course, the student will be able

1. To understand the nutritional needs, diet related problems during school going children to adolescents.
2. To gain knowledge nutritional needs during Pregnancy to adulthood.
3. To understand the role of nutrition in the prevention and management of various diseases like obesity, diabetes, cardiovascular disease, etc.

Unit I — 15 Lectures

- **Diets for school going children (7 to 12 years)**
  - Nutritional Requirements
  - Diet related problems
  - Packed Lunches
  - School Programs
- **Diets for Adolescence**
  - Nutritional Requirements
  - Food Requirements
  - Junk food
  - Nutritional Problems

Unit II — 15 Lectures

- **Diet during Pregnancy**
  - Nutritional and Food Requirements
  - General Dietary Problems
  - complication during pregnancy
  - Exercise or Physical activity
- **Diet during Lactation**
  - Nutritional Requirements
  - Food Requirements
- **Diet during Old age**
  - Nutritional and Food Requirements
  - Nutrition related Problems
  - Degenerative diseases

- Physical Activity during old age
- Drugs and supplements

Reference Books:

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.
8. Textbook of Human Nutrition by (Late) Anjana Agarwal and Shobha Udipi

Semester II

Laboratory Course VI (DSC Practical II)

Credits 2

Group A: Dairy Technology II

1. Preparation of Chakka
2. Preparation of Shrikhand
3. Preparation of Lassi
4. Preparation of Paneer & Channa
5. Preparation & Quality evaluation of Basundi
6. Preparation & Quality evaluation of Rabri
7. Preparation & Quality evaluation of Khoa
8. Preparation & Quality evaluation of Malai & Kandi Pedha
9. Preparation & Quality Evaluation of Rasogulla & Rasmalai
10. Preparation of Whey Beverage
11. Preparation of Ice-Cream &kulfi
12. Preparation & Quality Evaluation of Gulab-jamun

Group B: Human Nutrition II

1. Planning of weaning food for infants (6 -12 months)
2. Planning of mid-day meal for preschool children (1-6 years).
3. Planning of mid-day meal for School children (6- 12 years).
4. Planning of mid-day meal for Adolescents (13- 17 years).
5. Planning of low-cost nutritious recipe for pregnant women.
6. Planning of high-cost nutritious recipe for pregnant women.
7. Planning of low-cost nutritious recipe for lactating mothers
8. Planning of high-cost nutritious recipe for lactating mothers
9. Planning of low-cost nutritious recipe for old age.