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

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

Ref.No.SU/BOS/Science/146 **Date: 26/05/2026**

The Principal,
All Concerned Affiliated Colleges/Institutions
Shivaji University, Kolhapur.

Subject: Regarding revised syllabi of B.Sc. Part-III (Sem.V & VI) degree programme under the Faculty of Science and Technology as per NEP-2020 (2.0).

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 syllabi, nature of question paper B.Sc. Part-III (Sem.V & VI) degree programme under the Faculty of Science and Technology as per NEP-2020 (2.0).

B.Sc.Part-III (Sem. V & VI) as per NEP-2020 (2.0)			
1.	Animation (Entire)	6.	Food Science and Technology (Entire)
2.	Food Science (Entire)	7.	Food Technology & Management (Entire)
3.	Biotechnology (Entire)	8.	Environmental Science (Entire)
4.	Computer Science (Entire)	9.	Sugar Technology (Entire)
5.	Information Technology (Entire)		

This syllabus, nature of question and equivalence shall be implemented from the academic year 2026-2027 onwards. A soft copy containing the syllabus is attached herewith and it is also available on university website **www.unishivaji.ac.in>Syllabus>Syllabus as per NEP2020.**

The question papers on the pre-revised syllabi of above-mentioned course will be set for the examinations to be held in October /November 2026 & March/April 2027. 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,

Yours faithfully,

Dy Registrar

Encl: as above

for information and necessary action

Copy to:

1	Dean, Faculty of Science & Technology	6	Appointment Section A & B
2	Director, Board of Examinations and Evaluation	7	I.T.Cell /Computer Centre
3	Chairman, Respective Board of Studies	8	Eligibility Section
4	B.Sc.-M.Sc. Exam Section	9	Affiliation Section (T.1) (T.2)
5	Internal Quality Assurance Cell (IQAC Cell)	10	P.G. Seminar Section

SHIVAJI UNIVERSITY, KOLHAPUR

Established: 1962

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

Structure and Syllabus in Accordance with

National Education Policy – 2020

with Multiple Entry and Multiple Exit

Syllabus for

B. Sc. Part – III

Food Technology & Management

(Faculty of Science and Technology)

Semester V and VI

(To be implemented from Academic Year 2026-27

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

(NEP 2020)

❖ **Year of Implementation:** To be implemented from June 2026 onwards

- Guidelines shall be as per B. Sc. Regular Program.
- Rules and Regulations in accordance with National Education Policy with effect from Academic Year 2026-27.

❖ **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 Honors/ Honors 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	
Value Education Courses	VEC	04	
Skill Enhancement Courses	SEC	06	6.06%
Co-Curricular Courses(NSS/NCC/Sports/Cultural Activities)	CC	02	
TOTAL		**132**	**100%**

b) 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
Ability Enhancement Courses	AEC	08	7.95
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%**

c) 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	65.91
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	15.91
Research Methodology	RM	04	
Open Elective/Generic Elective Courses	OE/GE	10	5.68
Ability Enhancement Courses	AEC	08	7.95
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%**

*For honors degree with research, research project is applicable and for honors 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**

B.Sc. Part – III (Level-5.5) Semester V

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	Exam. Hours	Maximum Marks	Exam. Hours
Major IX- Meat, Fish & Poultry Processing Tech. I	2	-	2	40	1.5	10	1
Major X-Bakery Science & Technology	2	-	2	40	1.5	10	1
Major P-V (a) Laboratory Course XII Based on Major IX	-	4	2	50	4	-	-
Major P-V (b) Laboratory Course XIII Based on Major X		4	2	50	4	-	-
Major Program Elective I 1.Food Additives I 2. Beverage Technology I 3. Therapeutic Nutrition I	2	-	2	40	1.5	10	1
Major P-I- Laboratory Course XIV Based on Major Program Elective I 1. Food Additives I Lab 2. Beverage Technology I Lab 3. Therapeutic Nutrition I Lab	-	4	2	50	4	-	-
OE-5 Will be selected from Basket	2	-	2	40	1.5	10 --	1 --
VSC II Vocational Skills for Bakery Products Manufacturing Laboratory Course XV	-	4	2	50	4	--	--
AEC III English	2	-	2	40	1.5	10	1
OJT	-	-	4	80	-	20	-
Total			**22**	**480**		**70**	

B.Sc. Part – III (Level-5.5) Semester VI

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	Exam. Hours	Maximum Marks	Exam. Hours
Major XI-Meat, Fish & Poultry Processing Tech. II	2	-	2	40	1.5	10	1
Major XII-Confectionery Science & Technology	2	-	2	40	1.5	10	1
Major P-VI (a) Laboratory Course XVI Based on Major XI	-	4	2	50	4	--	--
Major P-VI (b) Laboratory Course XVII Based on Major XII	-	4	2	50	4	--	--
Major Program Elective II 1.Food Additives II 2. Beverage Technology II 3. Therapeutic Nutrition II-	2	-	2	40	1.5	10	1
Major P-II- Laboratory Course XVIII based on Major Program Elective II (2) 1.Food Additives II Lab 2. Beverage Technology II Lab 3. Therapeutic Nutrition II Lab	-	4	2	50	4	-	-
VSC III Vocational Skills for Snack and Savory Products Manufacturing Laboratory Course XIX	-	4	2	50	4	--	--
SEC III Food Industrial Economics & Management Skills	2	-	2	40	1.5	10	1
AEC IV English	2	-	2	40	1.5	10	1
IKS II - Traditional and Functional aspects of Indian Spices	2	-	2	40	1.5	10	1
FP	-	-	2	40	-	10	-
Total			**22**	**480**		**70**	

❖ **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 40 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	40 Marks	1.5 Hrs
Internal Assessment	10 Marks	1 Hr
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.

- **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. In such cases his 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 III & New B. B. Sc. FTM III)**

	Old Course	**Equivalent Course**	
Sem No.	**Title of Old Course & Credits**	**Title of New Course & Credits**	**Remark/s**
V	Animal Product Technology -I (02)	Meat, Fish & Poultry Processing Technology – (02)	Title of course changed; Syllabus reformulated
V	Bakery and Confectionery -I (02)	Bakery Science & Tech. -I (02)	Slight modification in syllabus

V	Beverage Technology - I	Food Additives - I/ Beverage Technology -I / Therapeutic Nutrition- I (Elective) (02)	Slight modification in syllabus
V	Food Quality Control Safety and Waste Management-I (02)	-	Course shifted to Second Year
V	Therapeutic Nutrition I (02)	Therapeutic Nutrition- I (Elective) (02)	Syllabus reformulated
V	Food Packaging-I (02)	-	Course shifted to Second Year
V	Industrial Business Management- I (02)	-	Course shifted to VI semester with change in title; Syllabus reformulated
V	English - III (02)	English - III (AEC) (02)	-
V	Research Methods in Statistics (02) (AEC)	-	Ability Enhancement Course (AEC) is English as per NEP 2.0
V	Laboratory Course- V (4)	Laboratory Course – XII (4)	Change in syllabus as per theory courses
V	-	Laboratory Course – XIII (2)	Change in syllabus as per theory courses
V	-	Laboratory Course - XIV (2) (VSC-II) Vocational Skills for Bakery Products Manufacturing	Newly added practical & syllabus as per theory courses
V	-	OJT (4)	Newly added as per NEP 2020 2.0
VI	Animal Product Technology -II (02)	Meat, Fish & Poultry Processing Technology – II (02)	Title of course changed; Syllabus reformulated
VI	Bakery and Confectionery - II (02)	Confectionery Science & Technology (02)	Slight modification in syllabus

VI	Food Quality Control Safety and Waste Management-II (02)	-	Course shifted to Second Year
VI	Therapeutic Nutrition II (02)	Therapeutic Nutrition- II (Elective) (02)	Syllabus reformulated
VI	Food Packaging-II (02)	-	Course shifted to Second Year
VI	Industrial Business Management- II (02)	Food Industry Economics and Management Skills (SEC) (02)	Title of course changed; Syllabus reformulated
VI	English - IV (02)	English - IV (AEC) (02)	-
VI	Research Methods in Statistics (02) (AEC)	-	Ability Enhancement Course (AEC) is English as per NEP 2.0
VI	Laboratory Course- VI (4)	Laboratory Course – XV (4)	Change in syllabus as per theory courses
VI	-	Laboratory Course – XVI (2)	Change in syllabus as per theory courses
VI	-	Laboratory Course - XVII (2) (VSC-III) Vocational Skills for Snacks & Savory Products Manufacturing	Newly added practical & syllabus as per theory courses
VI	-	IKS II – Traditional and Functional Aspects of Indian Spices (2)	Newly added as per NEP 2020 2.0
VI	Project	Field Project (FP)- (2)	Restructured as Field Project with two credits

Bachelor of Food Technology and Management-Course Structure (As per NEP 2020)
Credit Framework
Third Year

SEM Level	COURSES			OE	VSC/SEC	AEC/ VEC/ IKS	OJT/ FP/ CEP/ CC/ RP	Total Credits	Degree/ Cum. Cr. MEME
SEM V (5.5)	**Major-IX** Meat, Fish & Poultry Processing Technology I (2) **Major- X** Bakery Science &Technology (2) **Major P-V (a)** Laboratory Course XII Based on Major IX (2) **Major P-V (b)** Laboratory Course XIII Based on Major X (2)	**Major Program Elective I (2)** 1.Food Additives I 2. Beverage Technology I 3. Therapeutic Nutrition I **Major Program Elective I -** Laboratory Course XIV Based on Major Program Elective I (2) 1.Food Additives I Lab 2. Beverage Technology I Lab 3. Therapeutic Nutrition I Lab	-	OE-5 Will be selected from Basket (T/P) (2)	**VSC II (P)** Vocational Skills for Bakery Products Manufacturing Laboratory Course XV (2)	**AEC III** English (2)	OJT (4)	22	**UG Degree 132**
SEM VI (5.5)	**Major-XI** Meat, Fish & Poultry Processing Technology II (2) **Major- XII** Confectionery Science & Technology (2) **Major P-VI (a)** Laboratory Course XVI Based on Major XI (2) **Major P-VI (b)** Laboratory Course XVII Based on Major XII (2)	**Major Program Elective II (2)** 1.Food Additives II (2) O 2. Beverage Technology II (2) 3. Therapeutic Nutrition II (2) **Major Program Elective II -** Laboratory Course XVIII based on Major Program Elective II (2) 1.Food Additives II Lab 2. Beverage Technology II Lab 3. Therapeutic Nutrition II Lab	-	-	**VSC III (P)** Vocational Skills for Snack and Savory Products Manufacturing Laboratory Course XIX (2) **SEC III (T)** Food Industrial Economics & Management Skills (2)	**AEC IV** English (2) **IKS II –** Traditional and Functional aspects of Indian Spices (2)	FP (2)	22	
Credits	**8(T)+8(P)=16**	**4(T)+4(P)=8**	**-**	**2(T/P)**	**2(T)+4(P)=6**	**2(T)+4(T)=6**	**4(T)+2(T)=6**	**44**	

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	40	10	50
Minimum Marks required for passing	14	4	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)**		**CGPA**	**Letter Grade**
Absent	--		-	-
0 – 34	0		0.0 – 4.99	F (Fail)
35 – 44	5		5.00 – 5.49	C
45 – 54	6		5.50 – 6.49	B
55 – 64	7		6.50 – 7.49	B+
65 – 74	8		7.50 – 8.49	A
75 – 84	9		8.50 – 9.49	A+
85 – 100	10		9.50 – 10.0	O (Outstanding)

Note:

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

2. 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)**

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

- **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.

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

a) Theory (Semester exam) for each Theory paper: Maximum marks – 40

Modality of Assessment

Students appearing for the NEP B.Sc. III will be evaluated as per the 80:20 scheme wherein the term end exam will be of 40 marks each paper while 10 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-08Marks,
- ✓ Question No. 1 will be of an objective type eight objective will carry-08Marks.
- ✓ Question 2 will be descriptive two questions are to be attempted out of three and will carry 16 Marks, 08 Marks each)
- ✓ Question 3 will be short answer type four questions are to be attempted out of six and will carry 16 Marks, 04 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 40 marks

- The duration of this exam will be of 1.5 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 and Marking Scheme**

University Assessment for 40 Marks

B. Sc. (Part -_____) (Semester -_) Examination Food Technology and Management
Course Name (Course Code)

Day & Date: Total Marks: 40
Time:

Instructions: 1) All the questions are compulsory.

2) Figures to the right indicate full marks.

Q.1 Multiple choice questions (08-Questions)------- 08 marks

Q.2 Attempt **any two** of the following:
(Essay type/Broad answer questions) --- 16marks

A.
B.
C.

Q.3 Write short notes (**any four**) ---- 16marks
a)
b)
c)
d)
e)
f)

B. Internal assessment 20%

Sr No	Evaluation type (Any one of the following)	Marks
	Evaluation modalities: 1. Assignments that can include a. Essay Writing b. Solving Subjective Questions c. Problem Solving d. Report on lab/industry visit e. Any other subject/content specific assignments 2. Project based learning activities a. Group Discussion b. Research/Case studies c. Seminar Presentations d. Skits e. Poster Presentation f. Debate 3. Self-study/Class test 4. MCQ test	**10**

❖ 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/ 4 Credits and 100 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 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 new course (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.

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 14 marks out of 40 for the semester end theory examination, 18 out of 50 for the semester end practical examination and 4 marks out of 10 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 obtain45% 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 V

Meat, Fish & Poultry Processing Technology –I (Major IX)

Credits 2

Course Outcome- After completing this course, students will able to:

1. Comprehend egg structure, factors affecting quality (genetics, age), and methods for quality evaluation.
2. Learn techniques for handling, primary processing (washing, grading, sorting), and secondary processing (breaking, pasteurization, freezing, drying) of eggs and liquid egg products.
3. Learn the composition, structure, and nutritional value of meat.
4. Understand scientific slaughtering, dressing, post-mortem inspection, and safe handling practices and apply techniques like chilling, freezing, curing, smoking, dehydration, thermal processing, and canning to extend shelf life.

Unit I **(15 Lectures)**

Egg

- Structure, composition of egg
- Nutritive value of egg
- Quality of egg- External and internal factors
- Evaluation of quality and grading of eggs

Processing and Preservation of eggs

- Preservation of shell eggs
- Egg processing – freezing, drying
- Effect of heat on egg protein.
- Egg foams and factors influencing foam formation.

Unit II **(15 Lectures)**

Meat

- Introduction and Classes of meat
- Structure and composition of meat muscle
- Nutritive value of meat
- Pre-slaughter transport and care and ante-mortem inspection
- Slaughtering of animals, post-mortem inspection and grading of meat
- Post slaughter operations

Processing and preservation of meat

- Tenderization of meat
- Processing and preservation of meat- chilling, curing, freezing, ageing, smoking, thermal processing, canning, dehydration, use of preservatives, irradiation and hurdle technology

- Cooking of meat
- Manufacturing of meat products
- Packaging of meat

References:

1. Manay S.N. and Shadaksharaswamy M., Food facts and Principles, 2nd edition, New Age International (P) limited Publishers, 2001.
2. Potter N. N. and Hotchkiss J.H., Food Science, 5th Edition, CBS Publishers and distributors, 1966.
3. Srilakshmi B., Food Science, 3rd Edition, New Age International (P) limited publishers, 2003.
4. The complete technology book on Meat, Poultry and fish processing (2nd revised edition)- NPCS Board of Consultants and Engineers.
5. Alan, H. V. and Jane, P. S (1995). Meat and Meat Products: Technology, Chemistry and Microbiology: Champan & Hill, London.
6. Carmen, R. O. and George, J. M (1997). Poultry Meat and Egg Production: CBS Publications, New Delhi.
7. Lawrie, R. A (1998). Lawrie's Meat Science (6 ed.): Woodhead Publications, Cambridge.
8. Sharma, B. D (1999) Meat and Meat Products Technology Including Poultry Products Technology. Jaypee Brothers Medical Publishers Pvt. Ltd, New Delhi.
9. Sharma, B. D. and Kinshuki Sharma (2011) Outlines of Meat Science and Technology. Jaypee Brothers Medical Publishers Pvt. Ltd., New Delhi.
10. Vikas Nanda (2014) Meat, Egg and Poultry Science & Technology. I.K. International Publishing House Pvt. Ltd., New Delhi.

Semester V

Bakery Science & Technology (Major X) Credits 2

Course Outcome- After completing this course, students will able to

1.Explain principles of baking and bakery product classification.
2.Describe the function of major ingredients in bakery products.
3.Understand manufacturing processes of bread, cakes, biscuits, and cookies.
4.Identify common defects in bakery products and their causes.
5.Understand packaging, storage and quality control in bakery industry.

Unit I:

Introduction to Bakery Science **(15 Lectures)**

- History and development of bakery industry
- Principles of baking
- Classification of bakery products
- Types of bakery products: bread, cake, biscuits, cookies, pastries
- Basic bakery terminology
- Hygiene and sanitation in bakery operations

Bakery Ingredients and Their Functions

- Wheat flour: composition and gluten formation
- Role of water in dough formation
- Yeast and fermentation process
- Sugar, fat, eggs, milk and salt
- Leavening agents (baking powder, baking soda)
- Food additives, colors, and flavoring agents

Unit II: Processing of Bakery Products **(15 Lectures)**

- Bread making process
- Biscuit and cookie production
- Cake making methods (creaming, sponge method)
- Dough preparation and fermentation
- Baking process and temperature control
- Cooling and finishing operations

Bakery Equipment, Defects and Storage

- Bakery equipment: mixers, ovens, proofers, slicers
- Packaging materials for bakery products
- Shelf life and storage of bakery products
- Common defects in bread, cakes and biscuits
- Causes and prevention of defects
- Quality control in bakery industry

References

1. John Kingslee, A professional text to bakery and confectionery,2nd edition,2019
2. EIRI board of consultants and engineers, Confectionery and Chocolate Products with Manufacturing and Formulation Hand book
3. Aylwaed F. (2001): Food technology processing & quality control, 1st edition, Agrobios (India).
4. Harry W., Loesecke (2001): Outlines of food technology, 2nd edition, Agrobios (India).

Laboratory Course - XII (Major Practical V(a)) Credits 2

Based on Major IX

1. Estimation of quality and grading of eggs.
2. Isolation of albumin from egg.
3. Isolation of lecithin from egg yolk.
4. Study of slaughtering operation of meat animals.
5. Preservation of meat by pickling.
6. Preparation of meat nuggets
7. Canning of meat
8. Visit to slaughter house

Laboratory Course - XIII (Major Practical V(b) Credits 2

Based on Major X

1. Preparation and Quality evaluation of biscuits
2. Preparation and Quality evaluation of cookies
3. Preparation and Quality evaluation of drop cookies
4. Preparation and Quality evaluation of veg muffins
5. Preparation and Quality evaluation of Crackers
6. Preparation and Quality evaluation of ladi pav
7. Preparation and Quality evaluation of Bread Bun
8. Preparation and Quality evaluation of Bread loaf
9. Preparation and Quality evaluation of toast

Semester V

Food Additives – I (Major Programme Elective I)

Credits 2

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

1. To understand the classification, chemical nature, and function of food additives.
2. To learn the regulations and safety assessment (GRAS, ADI) of food additives.
3. To study the impact of additives on food quality, stability, and sensory properties.

Unit I: Introduction and Safety Regulations **(15 Lectures)**

Introduction, Definition of Food Additives, Need for Food Additives, Functions of Food Additives, Legislation and testing for additives, Classification of additives- Direct and Indirect additives, Major additives used in processing, antimicrobial agents- Mechanism of action and uses of Benzoic acid, Sorbic acid, Propionates, Nitrates/Nitrites and Sulphur dioxide, Antioxidants- Natural and synthetic antioxidants (BHA, BHT, TBHQ, Tocopherols), mechanisms of preventing lipid oxidation.

Unit II: Preservatives **(15 Lectures)**

Acidity regulators/ Acidulants- Citric acid, acetic acid, lactic acid, phosphoric acid- role in flavour and preservation, Stabilizers/Thickeners/ Gelling agents- Hydrocolloids (Agar, Carrageenan, Pectin, Gums) in food formulation, Emulsifiers- Mechanism of action, emulsifier type (Lecithin, mono and diglycerides), Color and Flavours- Natural and Synthetic dyes (Tartrazine, Sunset yellow), Flavour enhancers (MSG), and Sweeteners – Aspartame, Acesulfame, saccharin, sucralose, neotame.

References:

1. Shakuntala N Manay (2023): Foods, Facts and Principles, 5th edition, New Age International Publishers.
2. Vickie A. Vaclavik (2005): Essentials of Food Science, 2nd Edition, Springer
3. Richard J. Lewis, Sr. (2020): Food Additives Handbook, International Thomson Publishing
4. B. Srilakshmi (2018): Food Science, New Age International Publishers
5. Branen AL, Davidson PM and Salminon S. (1990): Food Additives. Marcel Dekker.

Semester V

Beverage Technology – I (Major Programme Elective I)

Credits 2

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

1. To describe the role of water in the food and beverage industry and explain the need for water quality management in beverage production.
2. To apply the process parameters for water purification.
3. To apply the process parameters for non-alcoholic, alcoholic beverages, and carbonated beverages.

Unit I **(15 Lectures)**

Introduction

History and Types of beverages and their importance; status of beverage industry in India, Water- Water in the food and beverage industry, types of water, water treatment in the beverage industry, water purification techniques, manufacturing process of water, Packaged Drinking Water and its standards, FSSAI specifications for beverages, Ingredients, manufacturing and packaging processes and equipment for different beverages.

Unit II **(15 Lectures)**

Non- Alcoholic Beverages

Types of Non-alcoholic beverages, Soft drink – Introduction, Raw material, Manufacturing process, Quality control. Apple Cider – Introduction, History, Raw material, Fermentation Changes in apple cider composition during fermentation and maturation.

Introduction to Carbonated beverages, Soft drink manufacturing process, Ingredients used in preparation of Carbonated beverages, Manufacturing process of Carbonated beverages, Low calorie beverages

References:

1. Ravinder A., Srinivas Maloo., Fr. Dr. S. Emmanuel S.J. (2017): Handbook of Fermented Foods and Beverages Technology, Himalaya Publishing House.
2. L. Jagan Mohan Rao (2015): Recent Trends in Soft Beverages, Woodhead Publishing India.
3. Alan Buglass, John Wiley and Sons, (2011): Handbook of Alcoholic Beverages, Wiley.
4. Woodroof J G and Phillips G F, (1974): Beverages: Carbonated and Non-Carbonated, AVI Publication.
5. Alan J. Buglass (2010): Handbook of Alcoholic Beverages: Technical, Analytical and Nutritional Aspects, Springer.

Semester V

Therapeutic Nutrition – I (Major Programme Elective I)

Credits 2

Course Outcomes: Upon successful completion of this course, students will be able to:

1. Understand the role, importance and planning of Therapeutic Diets.
2. Learn Pathophysiology of Fevers, Obesity, Underweight and GI diseases.
3. Plan Medical Nutrition Therapy for Fevers, Obesity, Underweight and GI diseases.

Unit I **(15 Lectures)**

- Introduction to diet therapy, Therapeutic Nutrition-Definition of Therapeutic diet, Planning therapeutic diets, Factors affecting therapeutic diet, Routine Hospital Diets- Regular diet, Soft diet, Liquid diets- Clear liquid diet, Full Fluid diet, Pureed diet, Restricted diets. Special feeding methods –Enteral/ tube feeding and types of tube feeding, types of enteral feeds, complications, Parenteral and Total Parenteral Nutrition, complications of TPN. Difference between Enteral and Parenteral Nutrition,Role of a Dietitian in Hospital, Patient care and Counselling,
- Diet in Fever, its causes, symptoms, dietary management, Diet in Typhoid its causes, symptoms, dietary management, Diet in Tuberculosis its causes, symptoms, dietary management, Diet in Influenza or flu its causes, dietary management,
- Diet in Obesity, its causes, treatment, complications, nutritional and food requirements, Diet in Underweight, its causes, treatment, complications, nutritional and food requirements.

Unit II **(15 Lectures)**

- Diet in Gastrointestinal diseases- Indigestion- causes, symptoms, dietary management, Diet in Peptic Ulcer- causes, symptoms, dietary management, Diet in Ulcerative Colitis- causes, symptoms, dietary management, Diet in Flatulence – causes, symptoms, dietary management, Diet in Malabsorption syndrome- causes, symptoms, dietary management, Diet in Tropical Sprue- causes, symptoms, dietary management, Diet in Celiac disease- causes, symptoms, dietary management, Diet in Disaccharide Intolerance- causes, symptoms, dietary management, Diet in Diarrhoea, Irritable Bowel disease and Steatorrhea -causes, symptoms, dietary management, Diet in Constipation and Inflammatory Bowel Diseases- causes, symptoms, dietary management,
- Diet in Gallbladder diseases- Bile, significance of bile, mechanism of action, Diet in Cholecystitis, Cholelithiasis, Cholelithiasis, and Choledocholithiasis- causes, dietary management.

References:

1. Sharma, Principles of Therapeutic Nutrition and Dietetics, 1st edition, CBS Publishers & Distributors Pvt. Ltd, Reprint, 2023.
2. Krause and Mahan, Food and Nutrition Care Process,14thedition; Elsevier, New York, 2015.
3. Shrilaxmi, Dietetics, New Age International Publishers, New Delhi, India,2019.
4. S. Joshi, Nutrition and Dietetics, McGraw Hill Education, India, 2015.
5. S. Agarwal, S. Udupi, Human Nutrition, Jaypee Publication, New Delhi, India, 2014.
6. G. Gandy,Oxford Handbook of Nutrition and Dietetics; Oxford Publication, UK, 2010.
7. M. Width, T. Reinhard, The Essential Pocket Guide for Clinical Nutrition, Oxford, UK, 2012.
8. Shrilakshmi, Nutrition Science, New Age International Publishers, New Delhi, India, 2019.

Laboratory Course - XIV (Major Practical Elective I)

Credits 2

Food Additives- I (Lab)

1. Evaluation of GRAS aspects of Food Additives
2. E numbers for different food additives
3. Qualitative Tests for the presence of benzoic acid in foods
4. Qualitative Tests for the Presence of sulphurous acid in foods
5. Quantitative determination of benzoic acid
6. Determination of nitrates and nitrites in Foods
7. Qualitative for the presence of non-nutritive sweeteners
8. Measurement of pH changes upon addition of alkali.
9. Study of gel strength, setting time, and texture.
10. Case study on identifying additives in popular food products.

Laboratory Course - XIV (Major Practical Elective I) Credits 2

Beverage Technology - I (Lab)

1. Determination of hardness of water
2. Microbial analysis of water for E.coli
3. Quality analysis of tea and coffee
4. Determination of brix value of different beverages
5. Determination of saccharine in beverages
6. Determination of benzoic acid in beverages
7. Determination of Sulphur dioxide in beverages
8. Determination of caffeine in cola-type beverages
9. Determination of pH and acidity of beverages
10. Visit to carbonation unit/ distilleries.

Laboratory Course - XIV (Major Practical Elective I) Credits 2

Therapeutic Nutrition – I (Lab)

1. Planning of Routine Hospital Diets
2. Planning of diet for Typhoid
3. Planning of Diet for Tuberculosis
4. Planning of Diet for Obesity
5. Planning of Diet for Underweight
6. Planning of Diet for Peptic Ulcer
7. Planning of Diet for Lactose Intolerance
8. Planning of Diet for Constipation
9. Planning of Diet for Gall bladder Disease
10. A visit to Food Service Unit of Hospital

Semester V

Open Elective – 05 (OE - 05)

Credits 2

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

Semester V

Laboratory

Course XV

Vocational Skills for Bakery Products Manufacturing (VSC I - P) Credits 2

Course Outcomes: After completing this course, students will be able to:

1. Understand and list the steps and equipments used in bakery product manufacturing
2. Prepare flow charts and design a small-scale plant layout
3. Identify and explain food safety risks in manufacturing process.
4. Gain knowledge about the feasibility of a business plan
5. Implement documentation and record keeping protocols for a business

Practicals

1. Preparation a flow chart for bakery product manufacturing process.
2. Operation and maintenance of bakery equipment.
3. Designing of small-scale bakery plant layout.
4. Developing a bakery business plan
5. Preparation of mandatory documentation for setting up a bakery unit.
6. Design and develop a food safety plan for bakery unit.
7. Packaging and labelling of any one major bakery product.
8. Visit to Bakery Unit and submission of visit report.

Semester V
Ability Enhancement Course - English (AEC III) Credits 2

AEC – III will be as per regular B. Sc. Structure

Semester V

On Job Training (OJT)
Guidelines for 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 food industries/ hospitals / research labs/ food testing laboratories.

A student will be assessed by the following points:

1. Seminar based on OJT
2. Submission of report based on OJT
3. Attendance (minimum 80%) and Certificate of student

The scheme of evaluation for On Job Training (OJT) is given below –

Sr. No.	University Assessment (UA)	Internal Assessment (IA)	Total marks
On Job Training (OJT)	80	20	100

After successful completion of On Job Training (OJT) the assessment for 100 marks shall be done by External and Internal Examiners as under:

Sr. No.	Particular	Marks
1	Quality and effectiveness of presentation	10
2	Depth of knowledge and demonstration skills	10
3	Variety and relevance of learning experience	10
4	Practical applications and relationships with concepts taught	10
5	Internship Report	30
6	Attendance record, student log, supervisor evaluation	30

Semester VI

Meat, Fish & Poultry Processing Technology –II (Major XI)

Credits 2

Course Outcome- After completing this course, students will able to:

1. Learn the skills required for pre-slaughtering of poultry and further processes.
2. Understand the various processing and preservation methods used for poultry.
3. Understand fish muscle structure, biochemistry (rigor mortis), and nutritional value for better processing.
4. Gain knowledge about novel techniques for freezing, canning, drying, smoking, and curing fish and shellfish.

Unit I **(15 Lectures)**

Poultry

- Structure, composition, classes of poultry
- Nutritive value of poultry meat
- Pre-slaughtering operations, ante-mortem inspection
- Slaughtering and dressing of poultry
- Post-mortem inspection

Processing and Preservation of poultry

- Post-slaughtering operations
- Grading and packaging of poultry meat
- Preservation of poultry meat- heating, drying, chemical treatment, irradiation.
- Manufacturing of poultry products
- Utilization of By-products from abattoir

Unit II **(15 Lectures)**

Fish

- Classification of fish
- Structure and composition of fish
- Nutritive value of fish
- Selection of fish
- Commercial fish harvesting, handling, transport and storage

Processing and preservation of fish

- Preservation of fish by curing, drying, smoking, freezing and canning

- Processing of value-added fish products
- Packaging of fish and fishery product

References:

1. Manay S.N. and Shadaksharaswamy M., Food facts and Principles, 2nd edition, New Age International (P) limited Publishers, 2001.
2. Potter N. N. and Hotchkiss J.H., Food Science, 5th Edition, CBS Publishers and distributors, 1966.
3. Srilakshmi B., Food Science, 3rd Edition, New Age International (P) limited publishers, 2003.
4. The complete technology book on Meat, Poultry and fish processing (2nd revised edition)- NPCS Board of Consultants and Engineers.
5. Alan, H. V. and Jane, P. S (1995). Meat and Meat Products: Technology, Chemistry and Microbiology: Champan & Hill, London.
6. Carmen, R. O. and George, J. M (1997). Poultry Meat and Egg Production: CBS Publications, New Delhi.
7. Lawrie, R. A (1998). Lawrie's Meat Science (6 ed.): Woodhead Publications, Cambridge.
8. Sharma, B. D (1999) Meat and Meat Products Technology Including Poultry Products Technology. Jaypee Brothers Medical Publishers Pvt. Ltd, New Delhi.
9. Sharma, B. D. and Kinshuki Sharma (2011) Outlines of Meat Science and Technology. Jaypee Brothers Medical Publishers Pvt. Ltd., New Delhi.
10. Vikas Nanda (2014) Meat, Egg and Poultry Science & Technology. I.K. International Publishing House Pvt. Ltd., New Delhi.

Semester VI

Confectionery Science & Technology (Major XII) Credits 2

Course Outcome- After completing this course, students will able to:

1.Explain classification and characteristics of confectionery products.
2.Describe properties and functions of sugar and other ingredients used in confectionery.
3.Understand processing methods for sugar-based and chocolate confectionery.
4.Identify common defects in confectionery products and methods to control them.
5.Understand packaging and storage requirements of confectionery products.

Unit I: **(15 Lectures)**

Introduction to Confectionery Technology

- Definition and classification of confectionery products
- History and development of confectionery industry
- Types of confectionery products
    - Sugar confectionery
    - Chocolate confectionery
- Overview of confectionery processing
- Hygiene and sanitation in confectionery production

Ingredients Used in Confectionery

- Sugar and its properties (physical and chemical)
- Glucose syrup, invert sugar, fructose, lactose
- Sugar alcohols and artificial sweeteners
- Role of fats, milk solids, cocoa, and flavoring agents
- Emulsifiers, stabilizers, colors, and additives used in confectionery

Unit II: **(15 Lectures)**

Processing of Confectionery Products

- Manufacture of hard boiled sweets and candies
- Preparation of toffee, caramel, fudge, and fondant
- Production of jellies, gums, and marshmallows
- Chocolate processing
    - Cocoa bean processing
    - Chocolate mixing, refining, conching, tempering and moulding

Quality Control, Defects and Packaging **(15 Lectures)**

- Quality characteristics of confectionery products
- Common defects in confectionery (sugar bloom, fat bloom, stickiness)
- Causes and prevention of defects
- Packaging materials used for confectionery
- Shelf life and storage conditions

References:

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

Semester VI
Laboratory Course - XVI (Major Practical VI(a))
Credits 2
Based on Major XI

1. Preparation of Chicken nuggets
2. Preparation of Chicken Patties
3. Preparation of Chicken Pickle
4. Preparation of Smoked Chicken/Barbeque
5. Study of anatomy and dressing of fish
6. Salting and drying of fish
7. Preparation of Prawn Pickle
8. Visit to Poultry house/Fish market

Laboratory Course - XVII (Major Practical VI(b))
Credits 2
Based on Major XII

1. Determination of Moisture in Cocoa Powder, Dry Mixtures of cocoa and sugars, Cocoa mass or cocoa/chocolate Liquor and cocoa cake, Sugar & sugar products (White sugar, Refined sugar, Khandsari sugar, Cube sugar, Icing sugar, Gur or Jaggery and Cane Gur/Cane Jaggery)
2. Determination of Acid Insoluble Ash in Sugar Boiled Confectionery & Lozenges, Chewing gum and bubble gum
3. Determination of Sucrose in Sugar Boiled Confectionery & Lozenges, Chewing gum and bubble gum, Ice lollies or edible ices
4. Determination of Fat in Sugar-Boiled Confectionery & Lozenges, Chewing Gum and Bubble Gum
5. Determination of Crude Fibre in Cocoa Powder, Cocoa Mass, or cocoa/chocolate Liquor and cocoa cake
6. Determination of Added Colour in Sugar-Boiled Confectionery & Lozenges, Chewing Gum and Bubble Gum, Cocoa Powder, cocoa mass/cake
7. Determination of Rancidity in Chocolate
8. Determination of Chocolate Component of Filled Chocolate

Semester VI

Food Additives – II (Major Programme Elective II) Credits 2

Course outcome: After completing this programme, students will be able to:

1. Understand the concept of different additives and their uses in food formulations.
2. Analyze regulatory considerations and safety aspects associated with the use of food additives in different food products.
3. Study the impact of food additives on food safety and hazards.

Unit I: Functional Food Additives **(15 Lectures)**

Anti-browning agents- Sulphites and non-sulphites browning agents, Leavening Agents: Baking powder, baking soda, and their application in bakery products, Humectants & Anti-caking Agents: Glycerol, sorbitol, and calcium silicate, Clarifying & Glazing Agents: Bentonite, gelatine, and wax coatings, Flour improvers, Anti-caking agents, Bleaching and Maturing agents, Curing agents, Dough improvers, Edible films, Fat replacers, Firming agents, Fumigants, Humectants, Sequestrants, Surface active agents, Nutrient Supplements, pH Control substances

Unit II Additives and Food Safety **(15 Lectures)**

Use of food additives and food safety, Evaluation of safety, Safety vs Hazards, Unintentional additives- Radio-active Fallout, Agricultural contaminants, Animal food additives, Advantages and disadvantages of Food additives, Limits of Food additives, Toxicological Evaluation of Food Additives and Adulterants.

References:

1. Shakuntala N Manay (2023): Foods, Facts and Principles, 5th edition, New Age International Publishers.
2. Vickie A. Vaclavik (2005): Essentials of Food Science, 2nd Edition, Springer
3. Richard J. Lewis, Sr. (2020): Food Additives Handbook, International Thomson Publishing
4. B. Srilakshmi (2018): Food Science, New Age International Publishers
5. Branen AL, Davidson PM and Salminon S. (1990): Food Additives. Marcel Dekker.

Semester VI

Beverage Technology – II (Major Programme Elective) Credits 2

Course Outcomes: Upon successful completion of the Course student will be able to -

1. Understand the fundamentals of alcoholic and non-alcoholic beverages, including their historical background, importance, and role in the food and beverage industry.
2. Classify wines and beers based on raw materials, processing methods, alcohol content, and quality parameters.
3. Describe the complete manufacturing processes of wine and beer, including raw material selection, fermentation, maturation, clarification, and packaging.

Unit I **(15 Lectures)**

Alcoholic Beverages

Wine - Introduction to wine, Types and classification of Wine, Manufacturing of Wine, Chemistry and Microbiology of wine, Defects in Wine

Beer- Introduction, Types and classification of Beer, Beer ingredients, Manufacturing of Beer, Chemistry and Microbiology of Beer, Defects in Beer

Unit II **(15 Lectures)**

Distilled Alcoholic Beverages - Types of Distilled alcoholic Beverages, Raw materials and Manufacturing of – Whiskey, Rum, Vodka, Brandy and Gin

Miscellaneous beverages- Coconut water, sweet toddy, sugar cane juice, coconut milk, flavoured syrups mineral water, natural spring water, flavoured water, carbonated water

References:

1. Ravinder A., Srinivas Maloo., Fr. Dr. S. Emmanuel S.J. (2017): Handbook of Fermented Foods and Beverages Technology, Himalaya Publishing House.
2. L. Jagan Mohan Rao (2015): Recent Trends in Soft Beverages, Woodhead Publishing India.
3. Alan Buglass, John Wiley and Sons, (2011): Handbook of Alcoholic Beverages, Wiley.
4. Woodroof J G and Phillips G F, (1974): Beverages: Carbonated and Non-Carbonated, AVI Publication.
5. Alan J. Buglass (2010): Handbook of Alcoholic Beverages: Technical, Analytical and Nutritional Aspects, Springer.

Semester VI

Therapeutic Nutrition – II (Major Programme Elective II) Credits 2

Course Outcomes: Upon successful completion of this course, students will be able to –

1. Understand the role, importance and planning of Therapeutic Diets in Liver diseases, CVDs, Renal Diseases and Metabolic Syndromes.
2. Learn Pathophysiology of Liver diseases, CVDs, Renal Diseases and Metabolic Syndromes
3. Plan Medical Nutrition Therapy for Liver diseases, CVDs, Renal Diseases and Metabolic Syndromes

Unit I **(15 Hours)**

- Diet in Liver diseases- functions of Liver, common liver diseases, Liver tests, causative agents of liver diseases, Types of liver damage- Fatty globulation/ fatty liver, Necrosis, Cirrhosis, - causes, symptoms, complications of cirrhosis dietary management, Diet in Jaundice- Causes, types of Jaundice, Dietary management, Diet in Hepatitis- types, causes, symptoms, dietary management , Diet in Hepatic Coma- causes, symptoms, dietary management, Diet in Pancreatitis- causes, types (Acute and Chronic), symptoms, dietary management,
- Diet in Cardiovascular diseases- important definitions, aetiology, Atherosclerosis, Dietary management in Myocardial Infraction, Principles of diet, Dys-lipidemia- Lipoproteins Functions, classification, role of Nutrition in Cardiac efficiency, Hypertension- cause, symptoms, treatment, dietary management,

Unit II **(15 Hours)**

- Diet in renal diseases- functions of Kidney, Glomerular Nephritis- causes, symptoms, dietary management, Kidney stones/ Renal stones/ Urinary Calculi- causes, types, symptoms, dietary management, Nephrosis- causes, symptoms, treatment, dietary management, Acute Kidney Injury/ Acute Renal Failure- causes, symptoms, dietary modification, Chronic Kidney Failure- causes, symptoms, dietary modification, Dialysis- Haemodialysis, Peritoneal dialysis, dietary management,
- Gout- causes, sign and symptoms, lifestyle modification, dietary management,
- Diet in Diabetes- Types, symptoms, tests for diagnosis, complications of diabetes – acute and chronic, dietary management, glycaemic index, Gestational diabetes.

References:

1. Sharma, Principles of Therapeutic Nutrition and Dietetics, 1st edition, CBS Publishers & Distributors Pvt. Ltd, Reprint, 2023.
2. Krause and Mahan, Food and Nutrition Care Process,14thedition; Elsevier, New York, 2015.
3. Shrilaxmi, Dietetics, New Age International Publishers, New Delhi, India,2019.
4. S. Joshi, Nutrition and Dietetics, McGraw Hill Education, India, 2015.
5. S. Agarwal, S. Udupi, Human Nutrition, Jaypee Publication, New Delhi, India, 2014.
6. G. Gandy,Oxford Handbook of Nutrition and Dietetics; Oxford Publication, UK, 2010.
7. M. Width, T. Reinhard, The Essential Pocket Guide for Clinical Nutrition, Oxford, UK, 2012.
8. Shrilakshmi, Nutrition Science, New Age International Publishers, New Delhi, India, 2019.

Laboratory Course - XVIII
(Major Programme Elective Practical II) Credits 2
Based on Major Programme Elective II

Food Additives- II (Lab)

1. Detection of non-nutritive sweeteners.
2. Study of effect of acidulants in fruit juices
3. Study of effect of stabilizers/thickeners on the quality of foods
4. Study of effect of clarifying agents on the fruit juices
5. Role of emulsifiers in foods
6. Role of leaving agent in baked food products
7. Role and mode of action of antioxidants in food products
8. Prepare Food Product using any Food Additive
9. Estimation of total antioxidant activity (e.g., DPPH method).

Laboratory Course - XVIII
(Major Programme Elective Practical II) Credits 2
Based on Major Programme Elective II

Beverage Technology - II (Lab)

1. Study of raw materials used in wine and beer production
2. Microscopic observation of yeast used in wine and beer fermentation
3. Flow chart preparation and process study of distilled alcoholic beverages
4. Identification of common wine and beer defects through case studies or samples
5. Determination of pH, TSS, and acidity of coconut water
6. Determination of sugar content in sugarcane juice
7. Determination of pH, acidity of sugarcane juice
8. Preparation of flavoured syrup and evaluation of quality parameters
9. Comparative study of mineral water, flavoured water, and carbonated water (label analysis and standards)
10. Visit to Winery/ Brewery plant

Laboratory Course - XVIII
(Major Programme Elective Practical II) Credits 2
Based on Major Programme Elective II
Based on Major Programme Elective II

Therapeutic Nutrition – II (Lab)

1. Planning of Diet in Liver Cirrhosis
2. Planning of Diet in Hepatitis
3. Planning of Diet in Hepatic Coma
4. Planning of Diet in Pancreatitis
5. Planning of Diet in Hypertension
6. Planning of Diet in Myocardial Infraction
7. Planning of Diet in Acute Renal Failure
8. Planning of Diet in Kidney Stones
9. Planning of Diet in Diabetes Mellitus II

Semester VI
Laboratory Course – XIX
Vocational Skill Course (VSC) III (P)
Vocational Skills for Snack & Savory Products Manufacturing
Credits: 2

Course Outcomes: After completing this course, students will be able to:

1. Understand and list the steps and equipment used in snack & savory product manufacturing
2. Prepare flow charts and design a small-scale plant layout
3. Identify and explain food safety risks in manufacturing process.
4. Gain knowledge about the feasibility of a business plan
5. Implement documentation and record keeping protocols for a business

Practicals

1. Preparation a flow chart for snack and savory product manufacturing process.

2. Operation and maintenance of snack and savory product manufacturing equipment.

3. Designing of small-scale snack and savory products manufacturing plant layout.

4. Developing a Snack and Savory Product Manufacturing business plan

5. Preparation of mandatory documentation for setting up a snack and savory unit.

6. Design and develop a food safety plan for snack and savory unit.

7. Packaging and labelling of any one major snack and savory product.

8. Visit to Snack and Savory Unit and submission of visit report.

Semester VI

Food Industry Economics Management

Skills (SEC III) Credits 2

Course Outcomes: Upon successful completion of the course, students will be able to:

1. Understand the key management principles
2. Get basic knowledge of management concepts
3. Understand the basic knowledge of business economics
4. Get basic knowledge of demand analysis
5. Acquaint them with different market structure in economy

Unit I Principles of Management **(15 Lectures)**

- Introduction, definition and importance of management
- Functions of Management Planning, Organizing, Staffing, Coordinating, Directing, Motivating and Controlling.
- Concept and Structure of an Organization Types of industrial organization a) Line organization b) Functional organization c) Line and Functional organization
- Hierarchical Management Structure Top, middle and lower-level management

Unit II Business Economics and Demand Analysis **(15 Lectures)**

- Meaning and features of Business Economics
- Meaning and determinants of demand
- Law of demand, Demand forecasting
- Elasticity of Demand- Concept, types and importance
- Production Function and Economic Markets
- Meaning & Features of Production Function
- Law of Variable Proportion, Law of Return to Scale
- Perfect Competition Market, Monopoly Market: Meaning Characteristics
- Monopolistic Competition Market, Oligopoly Market: Meaning Characteristics

References:

1. Principles of Management by Philip Kotler TEE Publication
2. Principles and Practice of Management by Shyamal Bannerjee: Oxford and IBM Publishing Co, New Delhi.
3. Financial Management by MY Khan and PK Jain, Tata McGraw Hill Publishing Co., 7, West Patel Nagar, New Delhi.
4. Modern Management Techniques by SL Goel: Deep and Deep Publications Pvt Limited Rajouri Garden, New Delhi.
5. Management by James AF Stoner, R Edward Freeman and Daniel R Gilbert Jr. : Prentice Hall of India Pvt Ltd, New Delhi.

6. Fundamentals of Business Economics- Mithani D.M., Himalaya Publishing House, New Delhi.
7. Business Economics- Mankar V. G., Himalaya Publishing House, New Delhi.
8. Business Economics- G. N. Zambre, Pimplapure Publisher, Nagpur.
9. Managerial Economics- D. M. Mithani, Himalaya Publishing House, New Delhi.
10. Modern Economic Theory- Dewett K. K., S.Chand and Company Ltd., New Delhi.

Semester VI
Ability Enhancement Course - English (AEC IV) Credits 2

AEC – IV will be as per regular B. Sc. Structure

Semester VI
IKS II
IKS: Traditional and Functional Aspects of Indian Spices
Credits: 02

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

1. Explain the concept of Ahara (food) in Indian Knowledge Systems.
2. Classify spices using Ayurvedic parameters.
3. Identify bioactive compounds and functional properties of major spices.
4. Evaluate the relevance of traditional spice knowledge in modern functional food development.

Unit I: Introduction to Indian Spices **(15 lectures)**

- History of Indian spices and their role in global trade.
- Indigenous classification and identification of spices
- Composition of spices
- Major and minor spices of India
- Indigenous drying, roasting, tempering (tadka) and grinding practices

Unit II: Functional Aspects of Indian Spices **(15 lectures)**

- Medicinal aspects of spices
- Traditional blending techniques
- Functional aspects: Spices in food preservation and digestion
- Nutraceutical properties of spices
- Spices in Ayurveda and Siddha medicine

References

1. Handbook of Spices in India: 75 Years of Research and Development Edited by P. N. Ravindran, K. Sivaraman, S. Devasahayam & K. Nirmal Babu
2. Indian Spices: The Legacy, Production and Processing of India's Treasured Export Edited by Amit Baran Sharangi
3. N. Shakuntala Manay and M Shadaksharaswamy, Food Facts and Principles, 5th Edition, New Age International (P) Limited, publishers
4. B. Srilakshmi, Food Science, 6th Edition, New Age International Pvt. Ltd, 2015.
5. Sunetra Roday, Food Science and Nutrition, 3rd Edition, Oxford University Press, 2018

Semester VI
Field Project (FP)

As per NEP 2020, students of B Sc. III (Semester VI) need to perform a Field Project (FP) for TWO (2) Credits i.e. 50 Marks.

The guidelines regarding the field project are as follows:

1) The total time allocation for the student to carry out field project is 60 hours.

2) Students should participate in field-based projects under the supervision of faculty.

3) Assignment of project topics to individual students or groups of students (2 to 4 students in one group) and one faculty member from the department will act as Guide for the student or group of students.

4) For a SURVEY based project related questionnaire (15 or more questions) should be prepared by students.

5) For an Experimental based project work, report should include Sample collection/Data collection/ Experiment performances in laboratory.

6) The departmental coordinator/guide should check the questions and finalize the questionnaire.

The question that may create unnecessary complications should be avoided. The questions should be qualitative as well as quantitative.

7) The student should compile all the relevant data and carry out its analysis.

8) A project report should be written individually in the standard format (2 Copies): Index, Introduction, Review of Literature, Materials and Methods, Results and Discussion, Summary and Conclusion/, References (APA Format) etc.

9) The project report should be of minimum 20 pages (excluding Title page, Certificate, Index, Acknowledgement etc.). Submit the project report with the Guide's signature to the department.

10) The oral presentation for all the projects should be arranged in the department. To evaluate the project, examiner should be appointed by Board of studies.

11) The total project work including preparation of questionnaire to presentation should be evaluated for 2 credits (50 Marks).

12) The scheme of evaluation for field project is given below –

Sr. No.	University Assessment (UA)	Internal Assessment (IA)	Total marks
Field Project (FP)	40	10	50

Nature of Question Paper and Marking Scheme

A. University Assessment for 40 Marks

B. Sc. (FTM) (Part-) (Semester-) Examination

Course Name (Course Code)

Day & Date: **Total Marks: 40**

Time:

Instructions:1) All the questions are compulsory.

2) Figures to the right indicate full marks.

Q. 1) Select the correct alternatives from the given choices. **[08]**

1.

2.

3.

4.

5.

6.

7.

8.

Q.2 Answer the following Questions (Any 2) **[16]**

1.

2.

3.

Q.3. Answer the following Questions (Any 4) **[16]**

1.

2.

3.

4.

5.

6.

.....*.....*.....*.....*.....*.....

B. Internal Assessment for 10 Marks

B. Sc. (Part -) (Semester -) Examination

Food Technology and Management

Course Name (Course Code)

Day & Date: **Total Marks: 10**

Time:

Q.1. Answer the following Questions (Any One) 10 Marks

1.

2.

3.

4.

……*……*……...*…….

C. Practical Examination:
University Assessment for 50 Marks

B.Sc. (FTM) (Part-) (Semester-___) Examination
Course Name (Course Code)

Day & Date: **Total Marks:50**

Time:

Instructions:

1) All questions are compulsory.

2) Figures to the right indicate full marks.

3) Draw neat labelled diagram wherever necessary.

Q.1. Principle Writing	5 Marks
Q.2. Perform the Experiment	25 Marks
Q.3. Journal	10 Marks
Q.4. Viva	10 Marks

.....*.....*.....*.....*.....*.....

C. Practical Examination:
University Assessment for 100 Marks

B.Sc. (FTM) (Part-) (Semester-___) Examination
Course Name (Course Code)

Day & Date: **Total Marks:100**

Time:

Instructions:

4) All questions are compulsory.

5) Figures to the right indicate full marks.

6) Draw neat labelled diagram wherever necessary.

Q1. A) Principle Writing	5 Marks
B) Write	5 Marks
Q2. A) Perform the Experiment	25 Marks
B) Perform the Experiment	25 Marks
Q3. Journal	20 Marks
Q.4Viva	20 Marks

.....*.....*.....*.....*.....*.....