

Estd. 1962

'A++" Accredited by NAAC (2021)

With CGPA 3.52

SHIVAJI UNIVERSITY, KOLHAPUR - 416004, MAHARASHTRA

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शिवाजी विद्यापीठ, कोल्हापूर -४१६००४,महाराष्ट्र

दूरध्वनी-ईपीएबीएक्स -२६०९०००, अभ्यासमंडळे विभाग दुरध्वनी ०२३१—२६०९०९४ ०२३१—२६०९४८७



Ref.No.SU/BOS/Science/271

To,

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

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

	B.Sc.Part-II (Sem. III & IV) as per NEP-2020 (2.0)					
1.	Pollution	8.	Food Science (Entire)			
2.	Biochemistry	9.	Biotechnology (Entire)			
3.	Food Science and Quality Control	10.	Environmental Science (Entire)			
4.	Computer Science (Optional)	11.	Information Technology (Entire)			
5.	Biotechnology (Optional/Vocational)	12.	Food Science and Technology (Entire)			
6.	Animation (Entire)	13.	Food Technology & Management (Entire)			
7.	Computer Science (Entire)	14.	All Faculty UG Part II Environmental Studies (VEC)			

This syllabus, nature of question and equivalence shall be implemented from the academic year 2025-2026 onwards. A soft copy containing the syllabus is attached herewith and it is also available on university website <u>www.unishivaji.ac.in NEP-2020@suk(Online Syllabus)</u>

The question papers on the pre-revised syllabi of above-mentioned course will be set for the examinations to be held in October /November 2025 & March/April 2026. 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 Dr. S. M. Kubal

Encl: As above

for Information and necessary action

Copy to:

Copy				
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.ScM.Sc. Exam Section	9	Affiliation Section (T.1) (T.2)	
5	Internal Quality Assurance Cell (IQAC Cell)	10	P.G. Seminar Section	

Date: 03/05/2025

SHIVAJI UNIVERSITY, KOLHAPUR



Established: 1962

'A⁺⁺'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 II

FOOD SCIENCE (ENTIRE)

(Faculty of Science and Technology)

SEMESTER III AND IV

(To be Implemented from Academic Year 2025-2026)

Preamble

Food science is a multidisciplinary field dedicated to the study of food composition, safety, processing, preservation, and nutrition. It integrates principles from chemistry, biology, microbiology, engineering, and nutrition to enhance food quality, safety, and sustainability. By applying scientific knowledge and technological advancements, food science plays a vital role in ensuring a safe, nutritious, and sustainable food supply for a growing global population.

As food systems evolve with new challenges, including climate change, food security, and consumer preferences, food scientists strive to develop innovative solutions that improve food production, reduce waste, and enhance health benefits. This field is essential for public health, economic development, and environmental sustainability, making it a cornerstone of modern food industries and policies.

Through continuous research and innovation, food science contributes to a future where food is not only safe and accessible but also aligns with the nutritional and ethical needs of diverse populations worldwide.

PROGRAM OUTCOMES			
PO1	Apply the scientific method to food science problems		
PO2	Apply critical thinking and analytical evaluation to contemporary food science information and literature.		
PO3	Apply principles from general chemistry, microbiology, analysis biotechnology and biochemistry to food science problems.		
PO4	To provide knowledge and skills for better preservation techniques, processing and value addition to agricultural products.		
PO5	To promote research and development for food product and process and guarantee sanitation and safety of processed food items.		
PO6	Utilize advanced instruments and technologies to process and analyze food products and to solve food safety problems.		
PO7	Critically access and analyze food science information available in the public domain in an innovative and ethical way.		
PO8	Design food products that meet the various food regulations and laws		
PO9	Utilize knowledge from the physical and biological sciences as a basis for understanding the role of food and nutrients in health and disease processes.		
PO10	Taking roles as researchers, academics, practitioners, or professionals		
	with reliable skills, mastering concepts and theories, and applying and developing food and related sciences.		

PROGRAM SPECIFIC OUTCOMES

PSO1	o impart knowledge in various aspects of Food Technology through Theory and Practical knowledge.
PSO2	To impart the knowledge about various compounds such as protein, carbohydrates, lipids amino acids, minerals, vitamins etc associated with the chemical compositions of food, their structures and functions.
PSO3	The students can gain knowledge about some very essential topic of nutrition and its metabolism balance inside the body
PSO4	To make the students familiar with the technologies of food processing and preservation of plant and animal foods, cereals, pulses, oilseeds, fruits vegetables, spices, meat, fish, poultry, sea food, milk and dairy products.
PSO5	To development students understanding and communication skills through various assignments which will enable them to develop skills in writing and effective's interpersonal skills. A presentation in different topics enhances their confidence, ability to express themselves & presentation skills

0	BJECTIVES OF FOOD SCIENCE PROGRAMME
POB1	To train students to understand and apply methods for food quality assessment, product development, and food safety measures to prevent contamination, spoilage, and foodborne illnesses throughout the food supply chain.
POB2	To examine the environmental and sustainability issues associated with food production, processing, and waste, and to explore ways to minimize the ecological footprint of food systems
POB3	To develop a deep knowledge of the chemical, physical, and biological properties of food components and how they interact to influence food quality and functionality
POB4	To provide students with a deep understanding of various food processing techniques and preservation methods that help maintain food quality, safety, and shelf life.
POB5	To explore the relationship between food and human health, including understanding how food nutrients contribute to health, well-being, and disease prevention.

Shivaji University, Kolhapur

Bachelor of Science (B.Sc.)

Under the Faculty of Science & Technology

(Structure, Syllabus, Rules and Regulations in accordance with National Education Policy with effect from Academic Year 2024-25)

1. Implementation of Revised guidelines and rules: The revised guideline and rules shall be implemented gradually as mentioned below:

Level	Programme		From Academic Year
Under gradua	ate Programme:		
Level4.5	Undergraduate	B.Sc. Part-I	2024-25
	Certificate (One year		
	or two semesters)		
Level5.0	Undergraduate	B.Sc. Part-II	2025-26
	Diploma(Two years		
	or four semesters)		
Level5.5	Bachelor's Degree	B.Sc. Part-III	2026-27
	(Three years or six semesters)		
Level6.0	Bachelor's Degree with Honours	B.Sc. Part-IV	2027-28
	/Research(Four years or eight		
	Semesters)		

(If the candidate wants to exit after a certain level, the awards after completing specific level will be: Undergraduate Certificate in Science, Undergraduate Diploma in Science, B. Sc. And B. Sc. (Honours/Research) for Level-4.5 and additional 4 credits, Level-5.0 and additional 4 credits, Level-5.5 and Level-6.0 respectively. Other provisions for multiple entry and multiple exit as per the university's rules and regulations are applicable).

1. Eligibility Criteria:

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 (Level4.5):

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 there to.

iii) Completed 2nd year of the 3-year diploma after10th

(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 there to.

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/ Honours with Research).

OR

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

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 with 48 credits. There shall be Undergraduate diploma in science with 92 credits. There shall be Three Year B.Sc. Programme with 132 credits. The candidate wishes to attempt for Four-Year B.Sc.(Hon./Research) may opt for 4th year 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).

1. 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	10.50
Indian Knowledge System(Generic)	IKS	02	10.60
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 4 year B.Sc. Programme (Honours Degree)

Course Name		Total Credits	% of total credits
Major			
Major Mandatory	MM	80	_
Major Elective	ME	16	
Vocational Skill Courses	VSC	06	
On Job Training	OJT	08	65.91
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%

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	(5.01
Field Project	FP	02	03.91
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	
Indian Knowledge System(Generic)	IKS	02	7.95
Value Education Courses	VEC	04	_
Skill Enhancement Courses	SEC	06	
Co-Curricular			1.55
Courses(NSS/NCC/Sports/Cultural	CC	02	4.55
Activities)			
TOTAL		176	100%

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

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

5. Scheme of Examination: Total marks shall be 50 for 2 credit course.

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
1. Semester-end Examination	40Marks	1.5 hrs
2. Internal Assessment	10Marks	1hrs
Total marks for each course	50Marks	

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. 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:

Level	Semester	Activities Per Semester	Marks
4.5	Semester-I	Assignment	10marks
	Semester-II	Unit test	10marks
5.0	Semester-III	Unit test	10marks
	Semester-IV	Oral examination/ Group discussion	10 marks
5.5	Semester-V	Seminar/ Group discussion/ Field Work/Project Work	10marks
	Semester–VI	Study tour/Field Work/ Project Work/Seminar	10 marks
6.0	Semester-VII	Case Study/Field Work/ Project Work	10 marks
	Semester-VIII	Case Study/Field Work/ Project Work	10marks

Outline for continuous internal assessment activities

6. Ordinances regarding the examination: O.B.Sc.2, 3 and 4 shall prevail.

7. 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 he/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.

8. 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. Minimum18 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.

%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	С
45–54	6		5.50- 6.49	В
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(Ou	tstanding)

Gradation Chart:

Note:

1. Marks obtained $\geq=0.5$ shall be rounded off to next higher natural number.

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

Calculation of SGPA &CGPA:

Semester Grade Point Average (SGPA)
 SGPA = Σ(Course credits × Grade points obtained)of a semester
 Σ(Course credits)of respective semester



9. 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.

10. Revised Rules- These revised rules shall be gradually implemented with effect from the academic year2024-25 for B.Sc. Degree programme. However the existing (i.e. pre-revised) rules shall remain in force for the students of old semester pattern during the transition period.

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 4^{th} 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 Annexure1.

R. B.Sc. No.3

List of Courses:

	Sem I	Subject I:DSCI,DSCII,andPractical 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:DSC III, DSC IV, and Practical II			
		• Subject II: DSC III, DSC IV, and Practical II			
		• Subject III: DSC III, DSC IV, and Practical II			
		• OE II(Theory/Practical)			
		• VEC I(Democracy, Election and constitution)			
	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			
		• AECI (English)			
DC. H		• CC			
B.SC. II	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)			
		• VECII(Environmental Studies)			
		• CEP			
	Sem V	• Major IX,X, and Major Practical V,VI			
		Major I(Elective), Major(Elective) Practical-I			
		OEV(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			
		• AECIV(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 text books 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

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.

The student will continue for B. Sc. Part III with the major subject the/ 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 up to 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.

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 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 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 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 obtaining 70% 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

Shivraj College of Arts, Commerce & D. S. Kadam Science College

Department of Food Science

B. Sc Part II Structure

SHIVAJI UNIVERSITY, KOLHAPUR NEP-2020(2.0):Credit Frame work for UG (B.Sc.) Programme under Faculty of Science and Technology								
SEM (Level)	COU	RSES	OE	VSC/SEC	AEC/VEC/IK S	OJT/FP/CEP /CC/RP	Total Crets	Degree/Comic. MEME
	MAJOR	MINOR						
SEM III (5.0)	Major V Cereals & Bakery Products Processing I (2) Major VI Food Biochemistry I (2) Major P III Lab Course VII (Based on Major V & VI)(2)	Minor V Dairy Technology I (2) Minor VI Meat Fish & Poultry Products Processing I (2) Minor P III Lab Course VIII (Based on Minor V & VI) (2)	OE-3 (2) (T)	VSC I Lab Course IX Vocational Skill Course in Jam, Jelly & Ketchup Processing (2) (P) (Major specific) SEC I Design & Development of New Product (2) (T)	AEC I (2) (English)	CC-I(2)	22	UG Diploma 88
SEMIV (5.0)	Major VII Cereals & Bakery Products Processing II (2) Major VIII Food Biochemistry II (2) Major P IV Lab Course X (Based on Major VII & VIII)(2)	Minor VII Dairy Technology II(2) Minor VIII Meat Fish & Poultry Products Processing II (2) Minor P IV Lab Course XI (Based on Minor VII & VIII)(2)	OE-4(2) (T)	SEC-II Lab Course XII Design & Development of New Product (2) (P)	AEC-II (2) (English) VEC-II (2) (Environmental studies)	CEP-I(2)	22	
Credits	8(T)+4(P)=12	8(T)+4(P)=12	2+2=4(T/P)	4(P/T)+2(P)=6	2+4=6	2+2=4	44	ExitOption:4creditsNS QF/Internship/Skill courses

Abbreviations:

MIN : Minor

- OE : Open Elective
- OEC : Open Elective Course
- SEC : Skill Enhancement Course
- VSC : Vocational Skill Course
- AEC : Ability Enhancement Course
- VEC : Value Education Course
- CEP : Community Engagement Programme
- CC : Co-curricular Courses

Note:

- University may decide to offer maximum of three subjects (Courses) in the first year. The student may select one subject out of combination of three subjects (Courses), (which a student has chosen in the first year) as a MAJOR subject (Course) and one subject (Course) as MINOR Subject in the second year. Thereby it is inferred that the remaining third subject (Course) shall stand discontinued.
- **DSC:** Discipline Specific Course
- MAJOR: Mandatory/Elective 25
- MINOR: Course may be from different disciplines of same faculty of DSC Major
- **OE(Open Elective):** Elective courses/Open Elective to be chosen compulsorily from faculty other than that of the Major.
- VSC/SEC: Vocational Skill Courses (MAJOR related)/Skill Enhancement Courses
- AEC/ VEC / IKS: Ability Enhancement Courses (English, Modern Indian Language)/Value Education Courses/ Indian Knowledge System (Generic & Specific))
- OJT/FP/RP/CEP/CC: On-Job Training (Internship/Apprenticeship) / Field Project (Major related)/ Research Projects (Major related) Community Engagement (Major related)/ Co-Curricular courses(CC) such as Health& Wellness, Yoga Education, Sport, and Fitness, Cultural activities, NSS/NCC and Fine /applied/visual/performing Arts / Vivek Vahini etc.

B.Sc Food Science Part II (Entire)

	SEMESTER-III										
Sr.	Course Name	Teachin	g Schen	ne	Exan	nination	1 Scher	me			
No		Theory a	and Prac	ctical	Unive	University		Internal Assessment			
110.				•	Asses	sment (UA)	(IA)	•		
		Lectur	Practi	Cred	Max	Min.	Exa	Max.	Min.	Exam	
		es	cal	it		Mark	m.	Mark	Mark	Hours	
		(Per	hours		Mar	s	Hou	s	s	110015	
		week)	(Per		ks		rs				
		Week)	week)								
1	Major V Cereals &	2	-	2	40	14	1.5	10	04	1	
-	Bakery Products	_		_			110	10	0.	-	
	Processing I										
2	Major VI Food	2	-	2	40	14	1.5	10	04	1	
	Biochemistry I										
3	Major Practical III:	-	2	2	50	18	4	-	-		
	Lab Course VII(Based						hours				
	on Major V & VI)						per				
							batch				
4	Minor V Dairy	2	-	2	40	14	1.5	10	04	1	
	Technology I										
5	Minor VI Meat,	2	-	2	40	14	1.5	10	04	1	
	Fish & Poultry										
	Products										
	Processing I										
6	Minor Practical III: Lab	-	2	2	50	18	4	-	-		
	Course VIII(Based on						hours				
	Minor V & VI)						per				
_					10		batch	10	0.1		
7	OE III	2	-	2	40	14	1.5/4	10	04		
							hours				
							per				
0	VSC II ab Course IV		2	2	50	10					
0	VSC I Lab Course IA	-	2	2	50	10	4 hours	-	-		
	Course in Iam Jelly						ner				
	& Ketchup						batch				
9	SFC I Design &	2	_	2	40	14	1 5	10	04		
	Development of New	2		2	-0	17	1.5	10	04		
	Product Processing										
10	AEC I English	2	-	2	40	14	1.5	10	04		
11	CC			2	+						
<u> </u>			<u> </u>	I –	1		1	1	1		

Academic year 2025-26

*Note: The marketing scheme of CC And CEP as per B. Sc. regular structure of Shivaji University, Kolhpaur

	SEMESTER-IV									
Sr.	Course Code	Teaching	Scheme	e	Exan	ninatio	n Schei	me		
No.		Theory an	nd Pract	ical	University Assessment (UA)			Interna (IA)	al Asses	sment
		Lectures (Per week)	Practi cal hours (Per week)	Cred it	Ma x. Mar ks	Min. Mark s	Exa m. Hou rs	Max. Mark s	Min. Mark s	Exa m Hour s
1	Major VII Cereals & Bakery Products Processing II	2	-	2	40	14	1.5	10	04	
2	Major VIII Food Biochemistry II	2	-	2	40	14	1.5	10	04	
3	Major Practical IV: Lab Course XI (Based on Major VII & VIII)	-	2	2	50	18	4 hours per batch	-	-	
4	Minor VII Dairy Technology II	2	-	2	40	14	1.5	10	04	
5	Minor VIII Meat, Fish & Poultry Products Processing II	2	-	2	40	14	1.5	10	04	
6	Minor Practical IV: Lab Course XII (Based on Minor VII & VIII)	-	2	2	50	18	4 hours per batch	-	-	
7	OE IV	2	-	2	40	14	1.5/4 hours per batch	10	04	
8	SEC II Design & Development of New Product Development	-	2	2	50	18	4 hours per batch	-	-	
9	AEC II English	2	-	2	40	14		10	04	
10	VEC II Environmental Studies	2	-	2	40	14		10	04	

11 CEP I -	- 2				
Theory and Practical	Total Marks for B Sc Food Science				
Lectures: 60 Minutes Each	(Entire) Part-II : 1100				
SEC- Skill Enhancement Course	Total Credits for B.Sc Food Science (Entire)Part-				
OE-Open Elective	II(Semester III & IV) :88				
• VEC: Value Education course					
AEC-Ability Enhancement Course					
VSC- Vocational Skill Course					
CC- Co- Curricular Course					
 CEP- Community Engagement Program 					
	Duration of Practical Examination as				
	per respective BoS guidelines				
	• Separate passing is mandatory for				
	Theory, Internal and Practical				
	Examination				

*Note: The marketing scheme of CC And CEP as per B. Sc. regular structure of Shivaji University, Kolhapur.

Equivalence of Second Year B.Sc Food Science

Semester III and IV

The Equivalence for the subjects/courses of Food Science at Second Year B. Sc Semester III and IV pre-revised Program under the faculty of Science and Technology is as follows.

Sr. No	Second Year B. Sc (Food Science) Semester III Pre- revised syllabus	Second Year B.Sc (Food Science) Semester III	Remark
		Revised syllabus	
1.	Cereals and Bakery Products	Cereals & Bakery Products Processing	No Change
	Trocessing I	I	
2.	Cereals and Bakery Products	Food	Change in subject
	Processing II	Biochemistry I	and shifted to Sem IV
3.	Legume and Oilseed	Dairy Technology	Change in Subject
	Processing I		as per NEP 2.0
1	Legume and Oilaged	Maat Eich P	Change in Subject
4.	Processing II	Poultry Products	change in Subject
	ribeessing in	Processing I	Requirements
5	Fruits and Vegetables	OF III	Added according to
5.	Processing I		NEP 2.0 structure
6.	Fruits and Vegetables	VSC I Vocational	Added according to
	Processing II	Skill Course in Jam,	NEP 2.0 structure
		Jelly & Ketchup	
7.	AEC :Environmental Studies	AEC English	Added according to
			NEP 2.0 structure
8.	SEC	SEC Design and	Added according to
		Development of	NEP 2.0 structure
		New Product	
9.	-	CC	Added according to
			NEP 2.0 structure

Second Year B. Sc semester III

Second	Year	B. Sc	semester	IV
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Sr.	Second Year B. Sc (Food	Second Year B.Sc	Remark
No	Science) Semester IV Pre-	(Food Science)	
	revised syllabus	Semester IV	
		Revised syllabus	
1	Milk and Milk Products	Cereal & Bakery	Change in
	Processing I	Product	nomenclature,
		Processing II	content and added
			to sem III
2	Milk and Milk Products	Dairy	Change in
	Processing II	Technology	Nomenclature and
		II	content
3	Meat, Fish and Poultry	Food	Change in Subject
	Processing-I	Biochemistry II	as per NEP 2.0
			Requirements and
			added to sem III
4	Meat, Fish and Poultry	Meat, Fish &	Change in
	Processing-II	Poultry Product	nomenclature
		Processing II	
5	Spices and Condiments	OE IV	Added according
	Processing-I		to NEP 2.0
			structure
6	Spices and Condiments	AEC English	Added according
	Processing-II		to NEP 2.0
			structure
7	Environmental Studies	VEC	No Change
		Environmental	
	~~~~	Studies	
8	SEC	SEC Design and	Added according
		Development of	to NEP 2.0
		New Product	structure
9		CEP	Added according
			to NEP 2.0
			structure

## Course Name with Code

Sr. No	Course Name	Course Code				
Semester III						
1	Major V Cereals & Bakery Products Processing I	BSU0325MML215C1				
2	Major VI Food Biochemistry I	BSU0325MML215C2				
3	Major Practical III: Lab Course VII(Based on Major V & VI)	BSU0325MMP215C1				
4	Minor V Dairy Technology I	BSU0325MIL215C1				
5	Minor VI Meat, Fish & Poultry Products Processing I	BSU0325MIL215C2				
6	Minor Practical III: Lab Course VIII(Based on Minor V & VI)	BSU0325MIP215C1				
	Semester IV					
7	Major VII Cereals & Bakery Products Processing II	BSU0325MML215D3				
8	Major VIII Food Biochemistry II	BSU0325MML215D4				
9	Major Practical IV: Lab Course XI (Based on Major VII & VIII)	BSU0325MMP215D2				
10	Minor VII Dairy Technology II	B U0325MIL215D3				
11	Minor VIII Meat, Fish & Poultry Products Processing II	BSU0325MIL215D4				
12	Minor Practical IV: Lab Course XII (Based on Minor VII & VIII)	BSU0325MIP215D2				

## SHIVAJI UNIVERSITY,KOLHAPUR Syllabus as per National Education Policy (NEP) 2020 B.Sc. Food Science SEMESTER–III Major V Cereals and Bakery Products Processing I Credits: 2 Semester End 40 Internal Assessment: 10 Total: 50 Introduces From June 2025

**COURSE OUTCOME:** The students will be able to

CO1 Recognize the parts and structures of cereal grains and capable of converting cereal grains into ingredients for baking goods

CO2 Recognize the crucial cereal quality traits and quality indicators. Have a working knowledge of how a cereal mill and quality lab works.

CO3 Understand the steps involved in rice milling, including de-hulling, polishing, and grading, and assess how these operations affect the quality and nutritional content of the rice. CO4 Understand the working principles, applications, and importance of various bakery equipment, and assess their role in ensuring the efficiency and quality of the baking process.

Unit No	Content	No of Hours
1	<ul> <li>Wheat: Structure and chemical composition of wheat grain Wheat milling Grades of wheat flour Dough rheology</li> <li>Rice: Structure and chemical composition of rice gram Milling of rice Modern rice milling unit operation Rice Parboiling technology</li> </ul>	15
2	<ul> <li>Raw material of bakery products:</li> <li>Introduction and importance of bakery Ingredients used and their function Process parameter</li> <li>Equipments:</li> <li>Working, principle and application</li> <li>1. Dough mixer</li> <li>2. Molding machine</li> <li>3. Oven machine</li> </ul>	15

#### **Suggested Reading:**

1. Bakery Products Science and Technology, Y.H.Hui, Wiley Blackwell Publishing, 2014.

2. Bakery and Confectionary products, AcharyaN.G.Ranga Agricultural University

3. Cereal Processing Technology, Gavin Owens, Wood Head Publishing Ltd, 2000

4. Textbook of Bakery and Confectionery, Yogambal Ashok kumar, Prentice Hall India Learning Private Limited, 2012.

5. Post Harvest Technology of Cereals, Pulses and Oilseeds, A.Chakraverty, Oxford and IBH Publishing Company, 2014

## SHIVAJI UNIVERSITY,KOLHAPUR Syllabus as per National Education Policy (NEP)2020

## **B.Sc. Food Science**

## SEMESTER-III

## Major VI Food Biochemistry I

## Credits: 2

## Semester End 40 Internal Assessment: 10 Total: 50

**Introduces From June 2025** 

## COURSE OUTCOME: The students will be able to

CO1 Explain the fundamental principles of biochemistry as they relate to food, including the structure and function of biomolecules (proteins, carbohydrates, lipids, and nucleic acids) and their role in food science.

CO2 Identify and explain key metabolic pathways involved in the conversion of food components into energy, including glycolysis, the citric acid cycle, and oxidative phosphorylation.

CO3 Describe the different types of carbohydrates (sugars, starches, fibers) in food, and understand their functional roles in food texture, sweetness, fermentation, and nutritional properties.

CO4 Explain the structure and properties of lipids (fats and oils) in food, including their role in flavor, texture, and as energy sources. Understand lipid oxidation and its impact on food quality and safety.

Unit No	Content	No of Hours
	Introduction to metabolism	15
	Catabolism	
	Metabolism	
1	Metabolism of Carbohydrates	
1	Digestion and Absorption of Carbohydrates	
	Basics of Metabolic Pathways	
	Glycolysis	
	Kreb'scycle	
	Electron Transport Chain	15
	Gluconeogenesis	
2	Glycogen metabolism	
	HMP pathway	
	Lipid metabolism	
	Digestion and absorption of Lipids	
	Oxidation of fatty acids	
	Ketone bodies	

## **Suggested Reading:**

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

## SHIVAJI UNIVERSITY,KOLHAPUR Syllabus as per National Education Policy (NEP)2020 B.Sc. Food Science

## SEMESTER-III

## **Minor V Dairy Technology I**

#### Credits: 2

## Semester End 40 Internal Assessment: 10 Total: 50

**Introduces From June 2025** 

COURSE OUTCOME: Students will be able to

CO1 Explain the fundamental principles of dairy science including the types and composition of milk, its nutritional properties, and the factors affecting its quality.

CO2 Understand the procedures involved in milk collection, handling, and preservation techniques.

CO3 Assess milk quality control measures.

CO4 Explain various dairy processing methods, such as pasteurization, homogenization, sterilization, and fermentation, and their importance in ensuring milk safety and extending shelf life.

CO4 To describe the terms pasteurized milk and sterilized milk, as well as the processes involved in making yoghurt, butter, cheese, milk powder, ice cream, and other fermented milk products.

Unit No	Content	No of Hours
	Introduction of dairy industry	15
	Present status and future prospects of dairy industry	
	Composition of milk	
	Factors affecting Composition of milk	
1	Physico – Chemical properties of milk.	
	Buying, receiving, collection, transportation of milk, storage	
	and distribution of milk,	
	Judging and Grading of Milk	
	Flavor defects in Milk, their causes and prevention	
	Primary Processing of Milk	15
	Filtration,	
2	Clarification cream separation	
	Heat treatment of milk.	
	Different milk products	
	Concentrated milk products (Condensed Milk, Evaporated	
	Milk, Khoa, Gulabjamun, Pedha)	
	Coagulated milk products	
	Fermented product	

#### **Suggested Reading:**

1. S. Janarthanan and S. Vincent. Practical Biotechnology– Methods and Protocols (Universities Press)

- 2. Chinnarayappa Molecular Biotechnology (Universities Press)
- 3. Knorr, D. 1982. Food Biotechnology. Marcel Dekker, New York.
- 4. Steinkraus, K.H. 1983. Handbook of Indigenous Fermented Foods. Marcel Dekker, N. York.
- 5. Fermentation Biotechnology, Principles, Processed Products by Ward OP, Open University Press.

## SHIVAJI UNIVERSITY,KOLHAPUR Syllabus as per National Education Policy (NEP)2020

## **B.Sc. Food Science**

#### SEMESTER-III

## Minor VI Meat, Fish Poultry Products Processing I

#### Credits: 2

## Semester End 40 Internal Assessment: 10 Total: 50

**Introduces From June 2025** 

COURSE OUTCOME: Students will be able to

CO1 Describe the basic structure and composition of meat and poultry, and understand how these components influence the quality and processing of the products.

CO2 Explain the various meat processing techniques, and understand how these processes affect the flavor, texture, and safety of the final meat products

CO3 Explain the functional properties of egg components and their role in food applications.

CO4 Assess the impact of storage conditions (temperature, humidity) on the freshness and quality of eggs, and recognize the signs of egg spoilage.

Unit No	Content	No of
		Hours
	Introduction of meat and slaughtering of animals	15
	Pre-slaughter transport and care and ante mortem inspection	
	Slaughtering of animals,	
	post-mortem inspection and grading of meat	
	Pre and post slaughter operations,	
	Classification and Structure and composition of meat	
	Nutritive value of meat	
1	Processing and preservation of meat	
	Manufacture of meat products and packaging.	
	Recent concepts in animal product processing	
	Aging or chilling, freezing, pickling, curing, cooking and	
	smoking of meat	
	Meat tenderization,	
	gelation preparation	
	Preservation with antibiotics, radiations,	
	Structure, Composition and Quality of Egg Structure,	15
	composition of egg	
	Nutritive value of egg	
	Evaluation of quality and grading of eggs	
2	Processing and Preservation of eggs	
2	Egg processing – freezing, drying and canning	
	Preservation of shell eggs	
	Effect of heat on egg protein.	
	Egg foams and factors influencing.	
	Preparation of protein concentrate	

## **Suggested Reading:**

1. Meat, Poultry & Fish Products Technology, Syed Imran Hashmi, VNMAU Parbhani

2. Principles of Meat Science Aberle E.D. Kendall Hunt Publication, Fifth edition, 2012

- 3. Handbook of Heat and Meat Processing Hue Y.H. CRC Press, New York, 2012
- 4. Meat Processing Improving Quality, Joseph Kerry.

5. Fish Processing Technology, George M Hall published by Backie academic and professional, ^{2nd} edition.

6. Post-harvest technology of fish and fish products, K.K.Balachandran published DAYA publishing house, 2016.

## SHIVAJI UNIVERSITY,KOLHAPUR Syllabus as per National Education Policy (NEP)2020

B.Sc. Food Science SEMESTER-III

# OE III

## Credits: 2 Semester End 40 Internal Assessment: 10 Total: 50 Introduces From June 2025

**COURSE OUTCOME** 

As per Shivaji University Regular B. Sc structure

Suggested Readings:

## SHIVAJI UNIVERSITY,KOLHAPUR Syllabus as per National Education Policy (NEP)2020 B.Sc. Food Science SEMESTER–III SEC I Design & Development of New Product Processing Credits: 2 Semester End 40 Internal Assessment: 10 Total: 50 Introduces From June 2025 COURSE OUTCOME

CO1 Understand and gain experience in the process of food product development

CO2 Identify challenges involved in the development of a new food product and how to find solutions.

CO3 Apply the relationship between theoretical and practical aspects of New product development

CO4 Develop critical thinking skills related to food products..

Unit No	Content	No of
		Hours
1	<b>Basics of Food Product Development</b> Definition, Classification of new food product	15
	Reason for new food, Product development- social concerns, Health concerns.	
	Product life cycle	
	New Product Development team, concept of market and marketing	
	Steps in Food Product Development)	
	Technology for New Product & Scale up Trials	15
	Adaptable technology and sustainable technology for standardized	
	formulation for process development	
	Process control parameters	
2	Scale up production trials for new product development at lab and	
2	pilot scale	
	Quality assessment of new developed products	
	Market testing and marketing plan	
	Costing and economic evaluation of developed products,	
	Commercialization / product launch for marketing	

SHIVAJI UNIVERSITY,KOLHAPUR Syllabus as per National Education Policy (NEP)2020 B.Sc. Food Science SEMESTER–III Major Practical III Lab Course VII (Based on Major V & VI) Credits: 2 Introduces From June 2025	
1	Physico-chemical properties grains
2	Introduction to utensils and equipments used in bakery
3	Effect of kneading on the development of gluten
4	Determination of gluten content in wheat flour
5	Quality testing of flour and yeast
6	Effect of water ratio on cooking quality of rice
7	Preparation of standard solutions and buffers
8	Effect of saliva amylase a. Effect of temperature b. Effect of pH c. Effect of salinity
9	Retention of carbohydrates a. Glucose b. Fructose c. Sucrose
10	Detection of protein

## SHIVAJI UNIVERSITY, KOLHAPUR Syllabus as per National Education Policy (NEP)2020 **B.Sc. Food Science SEMESTER-III** Minor Practical III Lab Course VIII (Based on Minor V & VI) Credits: 2 **Introduces From June 2025** Physical examination of milk 1 Specific gravity of milk 2 Determination of natural acidity of milk 3 Preparation of khoa 4 Preparation of gulab jamun 5

To study shelf-life of eggs by different method of preservation

Study of post-mortem changes in meat

Quality evaluation of meat

Quality evaluation of meat

Quality evaluation of egg

6

7

8

9

10

## SHIVAJI UNIVERSITY,KOLHAPUR

## Syllabus as per National Education Policy(NEP)2020

## **B.Sc. Food Science**

## SEMESTER-III

## VSCI: Lab course IX Vocational Skill Course in Jam, Jelly& Ketchup Processing

Credits: 2

**Introduces From June 2025** 

COURSE OUTCOME: After completing this programme, students will be able to

CO1 Understand the preparation of work area and process machineries for jam, jelly & ketchup processing

CO2 Gain knowledge about raw materials for the preparation of jam, jelly & ketchup

CO3 Learn manufacturing of jam, jelly and ketchup from fruits and vegetables either manually or mechanically

CO4 Documentation and maintaining of records related to jam, jelly & ketchup processing. CO5 Apply the principles of food safety and hygiene in the work environment.

1	Overview of Food Processing Industry
	<ul> <li>List of various sub sectors in food processing industry</li> </ul>
	<ul> <li>Explain different types of fruits and vegetables processing</li> </ul>
	• State the need for processing of fruits and vegetables
	• List the various units within a fruits and vegetables processing unit
	• State the methods of testing fruits and vegetables for accepted quality
	standards
2	Organizational Standards and Norms
-	• Roles and responsibilities of a jam, jelly and ketchup processing technician
	<ul> <li>Personal hygiene and sanitation guidelines</li> </ul>
	<ul> <li>Food safety hygiene standards in the work environment</li> </ul>
3	Preparation and Maintenance of Work Area and Process Machineries for
-	Jam, Jelly and Ketchup Processing
	• Materials and equipment used in the cleaning and maintenance of the work
	area
	<ul> <li>Common detergents and sanitizers used in cleaning work area and</li> </ul>
	machineries
	<ul> <li>Methods of cleaning and sanitization</li> </ul>
	<ul> <li>Process of preparing the work area for scheduled production</li> </ul>
	• Functions to be carried out before starting production
	Different types of maintenance procedures
4	Production of Jam, Jelly and Ketchup
	• Production planning for effective utilization of raw material and machineries
	<ul> <li>Checking the quality of fruits and vegetables</li> </ul>
	• Demonstration and Production of the technique/ process of preparation of
	jam/ jelly/ ketchup (Washing, Cutting, Pulping/Juice extraction)
	• Demonstration of packaging and analyse the quality of the finished product
	• Demonstration of cleaning the machineries used with recommended sanitizers
	following CIP (clean-in-place) procedure
5	Documentation and Record Keeping Related to Production of Jam, Jelly
	and Ketchup
	• Need for documenting and maintaining records of raw materials, processes
	and finished products
	• Method of documenting and recording the details of raw material to final

finished product
• Demonstration of process of documenting records of production plan, process
parameters, and finished products

#### Suggested Reading:

1) FICSI: Jam, Jelly and Ketchup Processing Technician, Level 4.

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

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

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

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

6) Food preservation Techniques - Atul Agnihotri

7) Fruit and Vegetable preservation – N.P. Singh

8) Fruit and Vegetable Preservation Techniques – R. K. Narang

9) Preservation of fruit and vegetables - Bhatiya Vijaya

10) Modern Technology of Tomato Processing and Dehydration – EIRI Board of Consultants and Engineers.

## SHIVAJI UNIVERSITY,KOLHAPUR Syllabus as per National Education Policy(NEP)2020 B.Sc. Food Science SEMESTER–III AEC I English Credits: 2 Semester End 40 Internal Assessment:10 Total:50 Introduces From June 2025

**COURSE OUTCOME** 

## SHIVAJI UNIVERSITY,KOLHAPUR Syllabus as per National Education Policy(NEP)2020 B.Sc. Food Science SEMESTER–III CC Co curricular courses Credits: 2 Introduces From June 2025

## SHIVAJI UNIVERSITY,KOLHAPUR Syllabus as per National Education Policy (NEP)2020

## B.Sc. Food Science SEMESTER-IV

## Major VII Cereals & Bakery Products Processing II

#### Credits: 2

## Semester End 40 Internal Assessment: 10 Total: 50 Introduces From June 2025

COURSE OUTCOME: The student will be able to

CO1 Explain the structure and chemical composition of **corn**, including its different types, and understand how the components influence its processing and uses.

CO2 Describe the malting process of barley & understand the significance of malting in the

production of malt extracts, beer, and other fermented products.

CO3 Capable of converting cereals into bakery goods

CO4 Analyze typical issues and their root causes in bakery products.

Unit No	Content	No of Hours
1	Corn Structure and composition of corn grain (different types) Wet and dry milling High fructose syrups and their uses Barley Structure and composition of barley Barley malting process Significance of malting Different types of malts and their food applications	15
2	<ul> <li>Processing of bakery product:</li> <li>Procedure of different types of bakery products (bread, cookies, crackers, cake and biscuits etc)</li> <li>Defects of baked products</li> <li>Millets</li> <li>Oat / Rye, Importance of Millet, composition, processing of millet</li> <li>Preservation of bakery products</li> <li>Freezing and frozen storage of baked products</li> <li>Safety and hygiene of bakery plants</li> </ul>	15

## **Suggested Reading:**

1. Bakery Products Science and Technology, Y.H.Hui, Wiley Blackwell Publishing, 2014.

2. Bakery and Confectionary products, AcharyaN.G.Ranga Agricultural University

3. Cereal Processing Technology, Gavin Owens, WoodHead Publishing Ltd, 2000

4. Textbook of Bakery and Confectionery, YogambalAshokkumar, Prentice Hall India

Learning Private Limited, 2012.

5. Post Harvest Technology of Cereals, Pulses and Oilseeds, A.Chakraverty, Oxford and IBH Publishing Company, 2014

# SHIVAJI UNIVERSITY,KOLHAPUR

Syllabus as per National Education Policy (NEP)2020

**B.Sc. Food Science** 

## SEMESTER-IV

## Major VIII Food Biochemistry II

## Credits: 2

## Semester End 40 Internal Assessment: 10 Total: 50

**Introduces From June 2025** 

**COURSE OUTCOME:** The students will be able to

CO1 Understand the structure and function of food proteins, including their role in texture, flavor, and nutritional value

CO2 Describe the structure, function, and mechanisms of enzymes in food processing, including their role in reactions

CO3 Discuss the biochemical basis of nutrition, including the role of vitamins, minerals, and micronutrients in metabolism and overall health.

CO4 apply biochemical principles to the food industry, making informed decisions about food development, nutrition, and safety.

Unit No	Content	No of Hours
	Protein metabolism	15
	Digestion and absorption of proteins	
	Transamination	
1	Deamination Urea cycle	
1	Enzymes	
	Chemical nature and nomenclature, classification, sources and	
	properties, mechanism of action, Coenzyme and prosthetic	
	groups application.	
	Biochemical changes in meat	15
2	Biochemical changes in meat and meat products during	
	processing.	
	Biochemical changes in fruits and vegetables	
	Biochemical changes in fruits and vegetables during post	
	harvest handling, processing and storage.	

## **Suggested Reading:**

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

## SHIVAJI UNIVERSITY,KOLHAPUR Syllabus as per National Education Policy (NEP)2020

## **B.Sc. Food Science**

## SEMESTER–IV Minor VII Dairy Technology II

## Credits: 2

# Semester End 40 Internal Assessment: 10 Total: 50

**Introduces From June 2025** 

**COURSE OUTCOM:** The student will be able

CO1 Apply the principles of dairy science and technology to develop and formulate dairy products, considering factors such as flavor, texture, nutritional content, and shelf life.

CO2 Apply theoretical knowledge in practical settings, design and formulate dairy products, ensure quality control.

CO3 Describe the principles and methods of whey utilization, including its potential for use in food products, nutritional supplements, and animal feed.

CO4 Identify key cleaning and sanitation protocols in dairy plants, including the proper use of detergents, disinfectants, and sanitizers, and how these practices prevent microbial contamination and maintain hygienic conditions.

Unit No	Content	No of Hours
	Other Milk Products	15
	Dried product (whey powder, ice cream mix powder, infant	
1	milk food, WMP, SMP)	
1	Other product (whole milk, standardized milk, reconstituted	
	milk, toned & double toned milk, cream and butter )	
	Ice-cream : Types of ice creams and manufacturing process	
	Byproducts Utilization	15
	Introduction, Classification and Composition of byproducts.	
2	Principles and methods of Whey utilization	
	whey based beverages like lassi and buttermilk	
	Hygiene & Sanitation in Dairy Industry	
	Hygiene, Sanitation & cleaning in Dairy Industry.	

**Suggested Reading:** 

1. Outlines of Dairy Technology, Sukumar De, Oxford University Press, 1st edition, 2001.

2. Dairy Engineering Advanced Technologies and Their Applications, Rupesh S Chavan, Netra R Goyal, MurlidharMeghwal, Taylor and Fancis, 1st edition, 2017.

3. Dairy Technology, Shivashraya Singh, illustrated, New India Publishing Agency- Nipa, 2013.

4. Structure of Dairy Products, A.Y. Tamime, Wiley-Blackwell, 1st edition, 2007.

5. Indian Dairy Products, Rangappa K.S., Asia Pub. House, 2nd edition, 1975.

## SHIVAJI UNIVERSITY,KOLHAPUR Syllabus as per National Education Policy (NEP)2020

## **B.Sc. Food Science**

## SEMESTER-IV

## Minor VIII Meat , Fish & Poultry Products Processing II

Credits: 2

Semester End 40 Internal Assessment: 10 Total: 50 Introduces From June 2025

COURSE OUTCOME: The students will be able to

CO1 Explain the process of poultry slaughtering and dressing, including the steps of evisceration, cleaning, and cutting. Understand the importance of biosecurity and animal welfare in poultry processing.

CO2 Understand poultry preservation methods, including refrigeration, freezing, marination, and cooking, and how these methods impact product quality, safety, and shelf life.

CO3 Describe the processing of fish including handling, cleaning, filleting, preservation methods like freezing, canning, and smoking, and the importance of maintaining freshness and quality..

CO4 Understand the unique challenges in fish and seafood processing, such as the high perishability of raw fish and the techniques to ensure safe and quality products.

Unit No	Content	No of Hours
	Slaughtering of poultry,	15
	Structure & composition of poultry birds	
	Pre-slaughter transport and care and ant mortem inspection	
	Slaughtering of poultry, post-mortem inspection and grading	
	of poultry meat	
	Structure and composition of poultry meat	
1	Nutritive value of poultry meat	
	Processing and preservation of poultry meat	
	Manufacture of poultry products	
	Preservation of poultry meat	
	Sources and developments of meat and poultry industries and	
	importance in national economy	
	By-products utilization of abattoir	
	Structure and composition of fish	15
	Types and Classification of Fish	
	Structure of fish Composition and Nutritive value of fish	
2	Post mortem changes	
	Processing and preservation of fish	
	Spoilage of fish	
	Processing of fish meal, fish flour, fish – oil.	
	Canning and freezing of fish	
	Fish cookery	
	Commercial fish handling, preservation & transport	
	Preparation of various fish products	

## **Suggested Reading:**

1. Meat, Poultry & Fish Products Technology, Syed Imran Hashmi, VNMAU Parbhani

2. Principles of Meat Science Aberle E.D. Kendall Hunt Publication, Fifth edition, 2012

3. Handbook of Heat and Meat Processing Hue Y.H. CRC Press, New York, 2012

 Meat Processing Improving Quality, Joseph Kerry.
 Fish Processing Technology, George M Hall published by Backie academic and professional, 2nd edition.

6. Post-harvest technology of fish and fish products, K.K.Balachandran published DAYA publishing house, 2016.

## SHIVAJI UNIVERSITY,KOLHAPUR Syllabus as per National Education Policy (NEP)2020 B.Sc. Food Science SEMESTER–IV OE IV Credits: 2 Semester End 40 Internal Assessment: 10 Total: 50

**Introduces From June 2025** 

COURSE OUTCOME

## SHIVAJI UNIVERSITY,KOLHAPUR Syllabus as per National Education Policy (NEP)2020 B.Sc. Food Science SEMESTER–IV AEC II English Credits: 2 Semester End 40 Internal Assessment: 10 Total: 50 Introduces From June 2025

SHIVAJI UNIVERSITY,KOLHAPUR Syllabus as per National Education Policy (NEP)2020 B.Sc. Food Science SEMESTER–IV VEC II Environmental Studies Credits: 2 Semester End 40 Internal Assessment: 10 Total: 50 Introduces From June 2025

SHIVAJI UNIVERSITY,KOLHAPUR Syllabus as per National Education Policy (NEP)2020 B.Sc. Food Science SEMESTER–IV Major Practical IV Lab Course X (Based on Major VII & VIII) Credits: 2 Introduces From June 2025		
1	Preparation of Cake	
2	Cake faults and their causes	
3	Preparation of bread	
4	Preparation of pancake	
5	Preparation of cream biscuits	
6	Preparation of Karachi Cookies	
7	Preparation of Nachos using millets	
8	Determination of Saponification value of Oil	
9	To determine the smoke point of fats and oils	
10	Study of gelatinization property from fruits and vegetables	

## SHIVAJI UNIVERSITY,KOLHAPUR Syllabus as per National Education Policy (NEP)2020 B.Sc. Food Science SEMESTER–IV Minor Practical IV Lab Course XI(Based on Minor VII & VIII) Credits: 2 Introduces From June 2025

1	Preparation of paneer
2	Preparation and quality evaluation of flavored milk
3	Preparation of mishit dahi
4	Preparation of shrikhand
5	Preparation of rasgulla
6	Preparation of lassi
7	Preparation of whey beverage drink
8	Slaughtering and dressing of poultry
9	Determination of moisture content from the different fish samples
10	Quality evaluation of fish
11	Evaluation of freshness of fish
12	Determination of water holding capacity and drip loss

SHIVAJI UNIVERSITY,KOLHAPUR Syllabus as per National Education Policy(NEP)2020 B.Sc. Food Science SEMESTER–IV SECII Lab Course XII Design & Development of New Product Credits: 2 Introduces From June 2025		
1	Market survey of existing various products	
2	Formulation of new products based on corporate decision/need based a. Protein-energ yrich b. Low calorie(fat replacer) c. Low sodium content d. Glycemic index based e. Cholestrolemic index based	
3	Product development based on above formulation depending on local sources/ technology	
4	Quality assessment a. New product development for b. Infant/weaning foods c. Geriatric d. Physiological status	
5	Visit to industry	

## SHIVAJI UNIVERSITY,KOLHAPUR Syllabus as per National Education Policy(NEP)2020 B.Sc. Food Science SEMESTER–III Community Engagement Programme(CEP) Credits: 2

**Introduces From June 2025** 

COURSE OUTCOME :

## NATURE OF QUESTION PAPER FOR B.Sc. PART – II, (40 + 10 PATTERN) ACCORDING TO REVISED STRUCTURE AS PER NEP - 2020 TO BE **IMPLEMENTED FROM ACADEMIC YEAR 2025-26 Maximum Marks: 40** Duration: 1.5 hrs.

## A. University Assessment for 40Marks

B. Sc Food Science (Semester-) Examination

**Course Name (Course Code)** 

Day & Date: Total Marks: 40

**Instructions:** 

1.

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]

2. 3. 4. 5. 6. 7. 8. Q.2 Answer the following Questions (Any 4 out of 6) [16] 1. 2. 3. Q.3. Answer the following Questions (Any 2 out of 4) [16] 1. 2. 3.

**Times:** 

## **B.** Internal Assessment for 10 Marks

B.Sc.(Food Science) Part II Semester III –Unit test

B.Sc.(Food Science) Part II Semester IV - Oral examination/ Group discussion

## **C. Practical Examination:**

University Assessment for 50 Marks

B. Sc Food Science II) (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 labeled 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