

 Estd. 1962 "A++" Accredited by NAAC (2021) With CGPA 3.52	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 दूरध्वनी ०२३१-२६०९०९४ ०२३१-२६०९४८७	 
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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

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Structure and Syllabus in Accordance with

National Education Policy – 2020

With Multiple Entry And Multiple Exit

Syllabus for

B.Sc. Part III

FOOD SCIENCE (ENTIRE)

(Faculty of Science and Technology)

SEMESTER V AND VI

(To be implemented from Academic Year 2026-2027)

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	To 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

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

(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 entries 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.

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 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			57.58
Major Mandatory(MM)	MM	52	
Major Elective(ME)	ME	08	
Vocational Skill Courses(VSC)	VSC	06	
On Job Training(OJT)	OJT	04	
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	
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			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 / Generi 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%

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

Course Name		Total Credits	%of total credits
Major			65.91
Major Mandatory	MM	72	
Major Elective	ME	16	
Vocational Skill Courses	VSC	06	
On Job Training	OJT	04	
Field Project	FP	02	
Research Projects*	RP	12	
Indian Knowledge System	IKS	02	
Community Engagement Programme	CEP	02	
Major Total Credits		116	
Minor	MIN	24	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 honours degree with research, research projects 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	2CreditCourse	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 in consultation with the concerned teacher shall decide about the genuineness of the case and decide to conduct special test to such candidate on the date fixed by the concerned teacher but before commencement of the concerned semester-end examination.

The outline for continuous internal assessment activities shall be as under:

Outline for continuous internal assessment activities

Level	Semester	Activities Per Semester	Marks
4.5	Semester–I	Assignment	10 marks
	Semester–II	Unit test	10 marks
5.0	Semester–III	Unit test	10 marks
	Semester–IV	Oral examination/ Group discussion	10 marks
5.5	Semester–V	Seminar/ Group discussion/ Field Work/Project Work	10 marks
	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	10 marks

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 NEP1.0/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. 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.

% 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)

Gradation Chart:

Note:

1. Marks obtained ≥ 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:

1. Semester Grade Point Average (SGPA)

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

2. Cumulative Grade Point Average (CGPA)

CGPA

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

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 year 2024-25 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 4th year which will have 44 credits. Hence, the Four- Year B. Sc. programme will be of 176 credits. (Please refer to the university regulations and structure of the programme for details).

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

The theory examination for 2 credits will be of 40 (Semester end examination) and 10 (Internal examination) marks.

The practical examination for 2 credits will be 50 marks at the end of each semester.

R.B.Sc.No.2

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

R. B.Sc. No.3

List of Courses:

B. Sc. I	Sem I	• Subject I:DSCI,DSCII,and Practical I • Subject II:DSC I,DSCII ,and Practical I • Subject III:DSCI,DSC II, and Practical I • OE I (Theory/Practical) • IKS I (Introduction to IKS)
	Sem -II	• Subject I:DSCIII,DSCIV,and Practical II • Subject II:DSC III, DSCIV, and Practical II • Subject III :DSCIII, DSCIV, and Practical II • OEII(Theory/Practical) • VECI(Democracy ,Election and constitution)
B.Sc. II	Sem III	• Major V,VI, and Major Practical III • Minor V, VI, and Minor Practical III • OEIII(Theory/Practical) • VSC I Practical(Major Specific) • SEC I Theory/Practical • AECI (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
B. Sc. III	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
	Sem VI	• Major XI ,XII ,and Major Practical VII,VIII • Major II(Elective), Major((Elective)Practical-II • VSC III Practical Major Specific • SEC III Practical • AEC IV(English) • IKS II (Major Specific) • FP

R. B.Sc. No.4

- A. Skill Enhancement Course (SEC):
Skill Enhancement Course should be selected from the basket provided by University.
- B. Open Elective Course (OE): Open Elective Course should be selected from the basket provided by University. This course is to be chosen compulsorily from faculty other than that of major or Geography or Mathematics or Statistics from OE basket.
- C. Co-curricular Courses (CC): For Semester III one Co-curricular course such as Health and Wellness/Yoga education / sports and fitness / Cultural Activities/ NSS / NCC / Fine Arts / Applied Arts / Visual Arts / Performing Arts is to be chosen compulsorily. The student should be engaged for four hours per week. The examination pattern will be decided by the respective bodies.
- D. On Job Training (OJT): **The candidate should complete the work of On Job Training of 4 credits in Semester V. The execution of OJT examination pattern shall be as per the OJT guidelines of the University.**
On-job training (OJT)/Internship/Apprenticeship of 120 hours must be completed by the candidate in industry /health sectors/research labs /public testing laboratories/diagnostic laboratories/Chemical Industry/Pharmaceutical Industry.
- E. Field Project (FP): The guidelines and examination pattern will be decided by the respective board of studies.

R. B.Sc. No.5

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

R. B.Sc. No.6

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

R. B.Sc. No.7

Detailed Syllabus:

The detailed syllabi for the various courses under this pattern shall be subject to such revision, modification etc. as may be made by the Academic council from time to time on the recommendations of the Board of Studies in different subjects. The 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 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 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) examination 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 candidates 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 Examination in First Class with Distinction.
- C. For Four Year B. c. with (Hon./Research) Degree: Those of the successful 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 on to complete any of the Universities in the State of Maharashtra for B.Sc. Part I Semester-I examinations 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

Shivaji University, Kolhapur
Bachelor of Science-Food Science
Third Year

SHIVAJI UNIVERSITY, KOLHAPUR								
NEP-2020 (2.0): Credit Framework for UG (B. Sc. III) Programme under Faculty of Science and Technology								
SEM (Level)	COURSES		OE	VSC/SEC	AEC/VEC/IKS	OJT/FP/ CEP/CC/RP	Total Credits	Degree/Comic. MEME
	MAJOR	MAJOR						
SEM V (5.5)	Major IX Food Safety Management System I (2) (T) Major X Legume & Oilseed Processing (2) (T) Major Practical V (a) Laboratory Course XIII (Based on Major IX) (2) (P) Major Practical V (b) Laboratory Course XIV (Based on Major X) (2) (P)	Major Programme Elective I (2) (T) 1. Food Packaging 2. Food Additives Major Practical – V (2) (P) Laboratory Course XV (Based on Major Programme Elective I) 1. Food Packaging lab 2. Food Additives lab	OE - 5 (2) (T/P) (To be Selected from Basket)	VSC II (2) Laboratory Course XVI Vocational Skills for Bakery Products Manufacturing (P)	AEC III (2) (English) (T)	OJT(04)	22	UG Degree 132 Credits
SEM VI (5.5)	Major XI Food Safety Management System II (2) (T) Major XII Sugar & Confectionary Processing (2) (T) Major Practical VI (a) Laboratory Course XVII (Based on Major XI) (2) (P) Major Practical VI (b) Laboratory Course XVIII (Based on Major XII) (2) (P)	Major Programme Elective II (2) (T) 1. Snack Food Processing 2. Food Refrigeration Major Practical – VI (2) (P) Laboratory Course XIX (Based on Major Programme Elective II) 1. Snack Food Processing lab 2. Food Refrigeration lab	---	VSC III (2) Laboratory Course XX Vocational Skills for Snack & Savoury Products Manufacturing (P) SEC III Food Industry Economics and Management skills (2) (T)	AEC - II (2) (English) IKS II Traditional and Functional Aspects of Indian Spices (2) (T)	FP-(02)	22	
Credits	8 (T) + 8 (P) = 16		2 (T)	2 (T) + 4 (P) = 6	2 (T) + 4(T) = 6	4 + 2 = 6	44	

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/Elective25
- **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:**VocationalSkillCourses(MAJORrelated)/SkillEnhancementCourses
- **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.

*Note: The marketing scheme of AEC, VEC and FP is as per B.Sc. regular structure of Shivaji University, Kolhapur.						
Sr. No.	Course Name	Theory and Practical			University Assessment (IA)	Internal Assessment (IA)
		Lecture s Hours	Practical Hours	Cred it	Max Marks	Max Marks
		Hours per Week				
1	Major IX Food Safety Management system I	2	-	2	40	10
2	Major X Legumes & oilseeds Processing	2	-	2	40	10
3	Major Practical V (a): Laboratory Course XIII (Based on Major IX)	-	4	2	50	-
4	Major Practical V (b): Laboratory Course XIV (Based on Major X)		4	2	50	-
5	Major Programme Elective I 1. Food Packaging 2. Food Additives	2	-	2	40	10
6	Major Practical V (ELEC) Laboratory Course XV (Based on Major Programme Elective I) 1. Food Packaging lab 2. Food Additives lab)	-	4	2	50	-
7	OE V	2	-	2	40	10
8	VSC II Laboratory Course XVI Vocational Skills for Bakery Products Manufacturing	-	4	2	50	-
9	AEC III English	2	-	2	40	10
10	OJT	-	-	4	80	20
	Total			22	480	70

SEMESTER – VI						
Sr. No.	Course Name	Teaching Scheme			Examination Scheme	
		Theory and Practical			University Assessment (UA)	Internal Assessment (IA)
		Lectures Hours	Practical Hours	Credit	Max Marks	Max Marks
		Hours per Week				
1	Major XI Food Safety Management system II	2	-	2	40	10
2	Major XII Sugar & Confectionery processing	2	-	2	40	10
3	Major Practical VI (a): Laboratory Course XVII (Based on Major XI)	-	4	2	50	-
4	Major Practical VI (b): Laboratory Course XVIII (Based on Major XII)		4	2	50	-
5	Major Programme Elective II 1. Snack Food Processing 2. Food Refrigeration	2	-	2	40	10
6	Major Practical VI (ELEC): Laboratory Course XIX (Based on Major Programme Elective II) 1. Snack Food Processing lab 2. Food Refrigeration lab	-	4	2	50	-
7	VSC III Lab course XX Vocational Skills for Snack & Savoury Products Manufacturing	-	4	2	50	-
8	SEC III Food Industry Economics and Management Skills	2	-	2	40	10
9	AEC II English	2	-	2	40	10
10	IKS II Traditional and Functional Aspects of Indian Spices	2	-	2	40	10
11	FP	-	-	2	40	10
	Total			22	480	70

Theory and Practical Lectures: 60 Minutes Each	Total Marks for B. Sc Food Science (Entire) Part-III : 1100
• SEC- Skill Enhancement Course • OE- Open Elective • VEC- Value Education course • AEC- Ability Enhancement Course • VSC- Vocational Skill Course • CC- Co-Curricular Course • CEP- Community Engagement Program	Total Credits for B. Sc Food Science (Entire) Part- III (Semester V & VI) :44
	• Duration of Practical Examination as per respective BoS guidelines • Separate passing is mandatory for Theory, Internal and Practical Examination

***Note:** The marketing scheme of AEC, VEC and FP is as per B.Sc. regular structure of Shivaji University, Kolhapur.

Equivalence of Third Year B. Sc Food Science

Semester V and VI

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

Third Year B.Sc semester V

Sr. No	Third Year B. Sc (Food Science) Semester V Pre- revised syllabus	Third Year B. Sc (Food Science) Semester V Revised syllabus	Remark
1.	Food Safety Management System	Food Safety Management System I	With minor changes
2.	Principles of Food Packaging	Major Elective I - Food Packaging	Change in Subject name and minor changes
3.	Snack food Processing	Major Elective II - Snack food Processing	With minor changes
4.	Fundamentals of Research Methodology	-	Removed according to NEP 2.0 structure
5.		VSC Vocational Skills for Bakery Products Manufacturing	Added according to NEP 2.0 structure
6.	AEC English	AEC English	No Change
7.		Legume & Oilseed Processing	Shifted from NEP 1.0 B. Sc Part II Sem III
8.		OJT	Added according to NEP 2.0 structure

Third Year B. Sc semester VI

Sr. No	Third Year B. Sc (Food Science) Semester VI Pre-revised syllabus	Third Year B. Sc (Food Science) Semester VI Revised syllabus	Remark
1	Food Additives		Shifted to Semester V
2	Sugar and Confectionery Processing	Sugar & Confectionary Processing	With minor changes
3	Food Business Entrepreneurship	SEC III Industrial Economics	Change in Subject as per NEP 2.0 Requirements
4	Fundamentals of New Product Development	Design and Development of New Product	Shifted to B. Sc. Part II Sem III
5	-	VSC Vocational Skills for Snack & Savoury Products Manufacturing	Added according to NEP 2.0 structure
6	AEC English	AEC English	No changes in syllabus
7		IKS Traditional and Functional Aspects of Indian Spices	Added according to NEP 2.0 structure
8		FP	Added according to NEP 2.0 structure

SHIVAJI UNIVERSITY, KOLHAPUR
Syllabus as per National Education Policy (NEP) 2020
B.Sc. Food Science
Semester V
Major IX FOOD SAFETY MANAGEMENT SYSTEM- I
Credits: 2
Semester End 40 Internal Assessment :10 Total:50
Introduces From June 2026

COURSE OUTCOME: The students will be able to

CO1 Recognize and identify the food contaminants influencing the safety of agricultural products

CO2 Understand and apply properly the national and international legislation/regulation.

CO3 Implement food safety management systems for primary production.

CO4 Evaluate food safety management system and recommend the preventive measures.

Unit No	Content	No. of Hours
1	Introduction to Food Quality and Food Safety Food Laws and Regulations : Voluntary and Mandatory Food Standards : Legal and Company Food Safety and Standards Act 2006 Hygiene and Sanitation in Food Industry	15
2	Food Safety at National and Global Level National Organization for Food Quality and Safety – FSSAI, BIS International Organizations for Food Safety – WHO, FAO, CAC ISO 9001 and 22000 HACCP and PRPs	15

Suggested Reading:

1. The Training Manual for Food Safety Regulators, Vol II - Food Safety Regulations and Food Safety Management (2010)
2. Food and Agriculture Organization of the United Nations. (1998).
3. Quality Control for Food Industry – Krammer & Twigg
4. Food Plant Sanitation: Design, Maintenance and Good Manufacturing Practices, Michael M. Cramer, CRC Press, 3rd edition, 2013.
5. Food and Agriculture Organization of the United Nations. (1998).

SHIVAJI UNIVERSITY, KOLHAPUR Syllabus as per National Education Policy (NEP) 2020 B.Sc. Food Science SEMESTER-V Major X Legumes & Oilseeds Processing Credits: 2 Semester End 40 Internal Assessment:10 Total:50 Introduces From June 2026		
COURSE OUTCOME: The students will be able to CO1 Students will learn about value-added products made from all grains as well as be exposed to various processing techniques and equipment CO2 To understand how to prepare items using pulses and various aspects of processing pulses CO3 Gain knowledge of various oil seeds, expeller-milled oils, solvent extraction of oils, oil refining, and the usage of oil seed meals for various food applications. CO4 The student will get knowledge of how the main grains and pulses are processed and learn more about grain handling and storage equipment.		
Unit No	Content	No. of Hours
1	Legume Processing Structure and composition of legumes Processing of legume and its effect on nutritional quality Legume Based Products Pulses Processing Pulse milling (Dal Milling) Pulses based products	15
2	Oilseeds Processing Structure and composition of oilseeds Extraction of oil from oilseeds Refining of Oil Quality Parameters and Testing of Oil	15

Suggested reading:

1. Post Harvest Technology of Cereals, Pulses and Oilseeds, A.Chakraverty, Oxford and IBH Publishing Company, 2014.
2. Cereal Processing Technology, Gavin Owens, WoodHead Publishing Ltd, 2000.
3. Food Science, B. Srilakshmi, New Age International Pvt Ltd Publisher 7th Edition, 2018.
4. Physical and chemical characteristics of oils, fats and waxes, David Firestone, Amer oil chemist's society, 3rd Edition, 2006
5. Handbook of oilseed and Fat technology By Dr. A.A. Gatade

SHIVAJI UNIVERSITY, KOLHAPUR
Syllabus as per National Education Policy (NEP) 2020
B.Sc. Food Science
SEMESTER-V
Major Programme Elective I
1. Food Packaging
Credits: 2
Semester End 40 Internal Assessment:10 Total:50
Introduces From June 2026

COURSE OUTCOME: The students will be able to

CO1 Explain the role of packaging in the food industry and the legislation involved.
CO2 Describe the making process, suitability, and functionality of each type of packaging materials for a specific product.
CO3 Explain the principles of innovative packaging technologies for use with food products.
CO4 Evaluate different packaging materials based on various types of analysis in the laboratory.

Unit No	Content	No. of Hours
1	Importance and Functions of Food Packaging Classification of Packages-Primary, Secondary & Tertiary Metal as a Packaging material Glass as a Packaging material Paper as a Packaging material Plastic as a Packaging material	15
2	Methods of food packaging Packaging Machineries Active packaging Aseptic packaging Biodegradable packaging	15

Suggested Reading:

1. International Pvt. Ltd. New Delhi- 110 002A Handbook on Food Packaging, P.Jacob John
2. Food Packaging, Prof. Neelam Khetar Paul and Dr.Darshan Punia
3. Food Packaging, Takashi Kadoya
4. Handbook of Food Processing, Packaging and Labelling, Jerry D'souza and Jatin Pradhan
5. International Pvt. Ltd. New Delhi- 110 002A Handbook On Food Packaging ,P.Jacob John

SHIVAJI UNIVERSITY, KOLHAPUR Syllabus as per National Education Policy (NEP) 2020 B.Sc. Food Science SEMESTER-V Major Programme Elective I 2. Food additives Credits: 2 Semester End 40 Internal Assessment:10 Total:50 Introduces From June 2026		
COURSE OUTCOME: The students will be able to CO1 Understand the role of food additives in manufacturing of food products. CO2 Have the knowledge regarding chemistry, applications, and International numbering system for Food Additives CO3 Comprehend the effects of processing on flavor generation, extraction of flavours and colours and their regulatory effects. CO4 Ingredients and their chemistry used in food production		
Unit No	Content	No. of Hours
1	Importance of food additives in food processing. classification and functions of food additives, Natural and synthetic additives INS and EV system for food additives. Food preservatives: Importance, Function and types	15
2	Sweeteners Food colorants Food flavours Thickeners, Emulsifiers and stabilizers	15

Suggested Reading:

1. Fennema, O.R. Marcel Dekker Principles of Food Science: Part-I Food Chemistry,, New York, Ed. 1976
2. Potter, N.N. AVI Food Science, , Westport. 3rd Ed. 1978.
3. Furia T.E. Handbook of food additives. VolI and VolII, 1980
4. George A.B Encyclopedia of food coloradditives, , VolIII; CRC Press, 1996

SHIVAJI UNIVERSITY,KOLHAPUR Syllabus as per National Education Policy (NEP) 2020 B. Sc. Food Science SEMESTER–V Major Practical V (a) Lab Course XIII (Based on Major IX) Credits: 2 University Assessment: 50 Introduces From June 2026	
1	Assessment of personal hygiene
2	Detection of adulteration in given food samples
3	Detection of adulteration in spices
4	Sensory analysis of food by hedonic rating
5	Preparation of process flow chart and identification of CCP's
6	Hazard analysis in food processing (biological, chemical, physical hazards)
7	Labeling requirements as per FSSAI guidelines
8	Visit to laboratory
9	Visit to Industry

SHIVAJI UNIVERSITY,KOLHAPUR Syllabus as per National Education Policy (NEP) 2020 B. Sc. Food Science SEMESTER–V Major Practical V (b) Lab Course XIV (Based on Major X) Credits: 2 University Assessment: 50 Introduces From June 2026	
1	Quality evaluation of legumes
2	Preparation of papad
3	Preparation of Dhokla
4	Preparation of legume/ pulses based savory shake
5	Oil extraction methods (Mechanical extraction, Solvent extraction)
6	Quality evaluation of oilseeds
7	Visit to laboratory
8	Visit to Industry

SHIVAJI UNIVERSITY,KOLHAPUR Syllabus as per National Education Policy (NEP) 2020 B. Sc. Food Science SEMESTER–V Major Practical V Lab Course XV Lab Course on Major Programme ELEC 1 1. Food Packaging Lab Credits: 2 University Assessment: 50 Introduces From June 2026	
1	Measurement of thickness of paper and paper boards
2	Measurement of water absorption of paper and paper boards
3	Measurement of bursting strength of paper and paper boards
4	Measurement Tear resistance of papers
5	Identification of Packaging materials
6	Edible packaging of Food Products (Fruits, Bread, Dairy)
7	Study of mandatory labeling requirements.

SHIVAJI UNIVERSITY, KOLHAPUR
Syllabus as per National Education Policy (NEP) 2020
B. Sc. Food Science
SEMESTER–V
Major Practical V Lab Course XV
Lab Course on Major Programme ELEC 1
2. Food Additives Lab
Credits: 2
University Assessment: 50
Introduces From June 2026

1	Write the application of additives used in given food products
2	Effect of thickener in food products
3	Effect of Gelling agent in food products
4	Effect of emulsifier in food products
5	Effect of bread improver in Bread
6	Effect of Flavors in food products
7	Effect of Colors in food product

SHIVAJI UNIVERSITY,KOLHAPUR
Syllabus as per National Education Policy (NEP) 2020
B.Sc. Food Science
SEMESTER-V
OE V
Credits:2
Semester End 40 Internal Assessment:10 Total:50
Introduces From June 2026

COURSE OUTCOME

As per Shivaji University Regular B. Sc structure

SHIVAJI UNIVERSITY, KOLHAPUR
Syllabus as per National Education Policy (NEP) 2020
B.Sc. Food Science
SEMESTER-V
VSC II Lab Course XVI - Vocational Skills for Bakery
Products Manufacturing
Credits: 2
University Assessment: 50
Introduces From June 2026

Course Outcomes : After completing this course, students will be able to:
CO1: Understand and list the steps and equipments used in bakery product manufacturing
CO2: Prepare flow charts and design a small-scale plant layout
CO3: Identify and explain food safety risks in manufacturing process.
CO4: Gain knowledge about the feasibility of a business plan
CO5: Implement documentation and record keeping protocols for a business

Sr. No.	Practical
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.

SHIVAJI UNIVERSITY,KOLHAPUR Syllabus as per National Education Policy (NEP) 2020 B.Sc. Food Science SEMESTER-V AEC III English Credits: 2 Semester End 40 Internal Assessment:10 Total:50 Introduces From June 2026
COURSE OUTCOME
As per Shivaji University Regular B. Sc structure

SHIVAJI UNIVERSITY, KOLHAPUR
Syllabus as per National Education Policy (NEP) 2020
B.Sc. Food Science
SEMESTER-V
OJT
Credits: 4
Semester end 80 + Internal Assessment 20 Total = 100
Introduces From June 2026

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

SHIVAJI UNIVERSITY, KOLHAPUR Syllabus as per National Education Policy (NEP) 2020 B.Sc. Food Science Semester VI Major XI FOOD SAFETY MANAGEMENT SYSTEM II Credits: 2 Semester End 40 Internal Assessment :10 Total:50 Introduces From June 2026		
COURSE OUTCOME: The students will be able to CO1 Recognize and identify the food contaminants influencing the safety of agricultural products CO2 Understand and apply properly the national and international legislation/regulation. CO3 Implement food safety management systems for primary production. CO4 Evaluate food safety management system and recommend the preventive measures.		
Unit No	Content	No. of Hours
1	Various Organizations in the area of Food standardization and quality Food and Agriculture organization, World Health organization, World Trade Organization, United states Department of Agriculture, Global gap, USFDA, Importance of Safe Food, microbiological considerations in food safety.	15
2	Food safety Management System Factors affecting Food Safety, Hazards -Types of hazards, biological, chemical, physical hazards Voluntary Standards: BRC, AGMARK, FSSC 22000, SQC TQM - concept and need for quality, components of TQM, Food Toxicity and its effect.	15

Suggested Reading:

1. Training manual for Food Safety Regulators, Vol II- Food Safety Regulations and Food Safety Management, 2010.
2. Food Quality and Safety Systems- A training manual on Food Hygiene and the Hazard Analysis and Critical Control Point (HACCP) system, Food and Agriculture Organization of the United Nations, Rome, Publishing Management Group, FAO Information Division, 1998.
3. Quality Control for Food Industry – Krammer & Twigg
4. Food Plant Sanitation: Design, Maintenance and Good Manufacturing Practices, Michael M. Cramer, CRC Press, 3rd edition, 2013.

5. Food Quality and Safety Systems- A training manual on Food Hygiene and the Hazard Analysis and Critical Control Point(HACCP) system, Food and Agriculture Organization of the United Nations, Rome, Publishing Management Group, FAO Information Division, 1998.

SHIVAJI UNIVERSITY,KOLHAPUR Syllabus as per National Education Policy(NEP)2020 B. Sc. Food Science SEMESTER–VI Major XI SUGAR AND CONFECTIONERY PROCESSING Credits: 2 Semester End 40 Internal Assessment:10 Total:50 Introduces From June 2026		
COURSE OUTCOME: Students will be able to CO1Identify commodities and specialist equipment associated with the production of sugar and chocolate confectionery items and demonstrate knowledge of their application CO2 Produce a range of chocolate candies, using appropriate pre-crystallization methods CO3 Produce a range of sugar confectionery items, using appropriate cooking methods CO4 Describe and discuss the principles, techniques and methods used in the production of sugar and chocolate confectionery		
Unit No	Content	No. of Hours
1	Sugar sources and manufacturing Uses of sugar in food industry, Types of syrups Sugar based confectionery processing: High boiled sweets, Toffee, Fudge, and Caramel, Lozenges, fondants and chewing gums. Problems in confectionery products	15
2	Chocolate Processing Cocoa processing Chocolate processing: Ingredients, mixing, refining, conching, tempering, moulding, cooling, coating. Problems in Chocolate processing Machinery and Additives in confectionery Quality parameters of confectionary products	15

Suggested Reading:

1. Yogambal Ashok kumar, Textbook of Bakery and Confectionery, Prentice Hall India Learning Private Limited, 2012.
2. William P Edwards, The Science of Sugar confectionery, Royal Society of Chemistry, 2nd edition,2018.
3. Peter P. Greweling, Wiley, Chocolate and Confections; Formula, Theory and Technique for the Artisan Confectioner, 2nd edition, 2012.
4. Ferenc A. Mohos, Wiley-Blackwell, Confectionery and Chocolate Engineering: Principles and Applications, 2010.
5. Bakery and Confectionery, Acharya NG Ranga Agricultural University.

SHIVAJI UNIVERSITY, KOLHAPUR Syllabus as per National Education Policy (NEP) 2020 B.Sc. Food Science SEMESTER-VI Major Programme Elective II 1. Snack Food Processing Credits: 2 Semester End 40 Internal Assessment:10 Total:50 Introduces From June 2026		
COURSE OUTCOME: Students will be able to CO1 Give knowledge of various developments of snack food products. CO2 Practically prepare snack foods from variety of raw material CO3 The student will be competent in analyzing the shelf life and quality of snack food. CO4 Provides knowledge about shelf life and quality characteristics of snack food product.		
Unit No	Content	No of Hours
1	Introduction to Snack Food Ingredients Importance and scope of snack food technology Ingredients commonly used in snack food, their attributes and functions. Equipment and Packaging Equipment for frying, drying, baking, Equipment for popcorn processing. Quality Evaluation of Snack Food ,	15
2	Snack Food Products and Processing Potato Chips, Meat based snacks. Snacks based on popcorn, Puffed and flaked cereals, simulated potato chips, baked snacks. Nut based snacks (salted, spiced and sweetened) , Savory and Farsans, Processing of Papad, Chips and Wafers Application of seasonings Indian Savory Sweets	15

Suggested Reading:

1. Snack Foods Processing, Edmud W Luaas, Lloyd W Rooney, CRC Press, 2001.
2. Advances in Food Extrusion Technology, Medeni Maskan, Aylin Altan, illustrated edition, 2016.
3. Snack Foods, R. Gordon Booth, Springer, 5th edition, 2011.
4. The Complete Technology Book on Snack Foods, Dr.Himatri Panda, NIIR Project Company Services, 2nd edition, 2013

SHIVAJI UNIVERSITY, KOLHAPUR Syllabus as per National Education Policy (NEP) 2020 B. Sc. Food Science SEMESTER-VI Major Programme Elective II 2. Food Refrigeration Credits: 2 Semester End 40 Internal Assessment: 10 Total: 50 Introduces From June 2026		
COURSE OUTCOME: Students will be able to CO1 Give knowledge of various developments of snack food products. CO2 Practically prepare snack foods from variety of raw material CO3 The student will be competent in analyzing the shelf life and quality of snack food. CO4 Provides knowledge about shelf life and quality characteristics of snack food product.		
Unit No	Content	No of Hours
1	Principles of Refrigeration Necessity of Refrigeration, unit of refrigeration, concept of COP Air refrigeration system, components of air refrigeration system and its applications Application of refrigeration, house hold refrigerators, water coolers Types of refrigerants	15
2	Operation and maintenance Controlled atmosphere and modified atmosphere storages: Operation and maintenance, Cleanliness, defrosting practices, preventive maintenance, safety measures Controlled atmosphere and Modified atmosphere storages Principles and basics of their construction Chilling of Foods Chilling equipment for liquid foods. Secondary refrigerants and direct expansion techniques in chilling. Chilled foods transport and display cabinets - Basics of Chilled foods microbiology. Packaging of Chilled foods - Hygienic design considerations for chillers and chilled Storages. Cool storages and their applications. Evaporative cooling and its applications.	15

Suggested Readings:

- 1) Refrigeration and Air conditioning Khurmi R. S, S Chand publication, New Delhi, (2008 ISBN-10: 8121927811)
- 2) Refrigeration and Air conditioning Arora C. P. Tata McGraw Hill Publication, New Delhi, (2009), ISBN-13-978-07-008390-5
- 3) Basic Refrigeration and Air conditioning Ananth narayan P. M. Tata McGrawHill Publication, New Delhi, (2013), ISBN-9781259062704
- 4) PHI Publication, New Delhi, ISBN-9788120326712 Principles of refrigeration Dossat R. J, John Wiley and Sons Ltd, UK, (2009) ISBN 978-0130272706

SHIVAJI UNIVERSITY, KOLHAPUR Syllabus as per National Education Policy (NEP) 2020 B.Sc. Food Science SEMESTER–VI VSC III Lab Course XX - Vocational Skills for Snack & Savoury Products Manufacturing Credits: 2 University Assessment: 50 Introduces From June 2026	
Course Outcomes: After completing this course, students will be able to: CO1: Understand and list the steps and equipments used in snack & savoury product manufacturing CO2: Prepare flow charts and design a small-scale plant layout CO3: Identify and explain food safety risks in manufacturing process. CO4: Gain knowledge about the feasibility of a business plan CO5: Implement documentation and record keeping protocols for a business	
Sr. No.	Practical
1.	Preparation a flow chart for snack and savoury product manufacturing process.
2.	Operation and maintenance of snack and savoury product manufacturing equipment.
3.	Designing of small-scale snack and savoury products manufacturing plant layout.
4.	Developing a Snack and Savoury Product Manufacturing business plan
5.	Preparation of mandatory documentation for setting up a snack and savoury unit.
6.	Design and develop a food safety plan for snack and savoury unit.
7.	Packaging and labelling of any one major snack and savoury product.
8.	Visit to Snack and Savoury Unit and submission of visit report.

SHIVAJI UNIVERSITY, KOLHAPUR Syllabus as per National Education Policy (NEP) 2020 B. Sc. Food Science SEMESTER–VI SEC III Food Industry Economics and Management Skills Credits: 2 Semester End 40 Internal Assessment: 10 Total: 50 Introduces From June 2026		
COURSE OUTCOME: After completing this course, students will be able to CO1 Understand the key management principles CO 2 Get basic knowledge of management concepts CO 3 Understand the basic knowledge of business economics CO 4 Get basic knowledge of demand analysis CO 5 Acquaint them with different market structure in economy		
Unit No	Content	No of Hours
1	Principles of Management 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	15
2	Business Economics and Demand Analysis 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	15

Suggested Reading:

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.

SHIVAJI UNIVERSITY,KOLHAPUR Syllabus as per National Education Policy (NEP) 2020 B.Sc. Food Science SEMESTER–VI AEC VI English Credits: 2 Semester End 40 Internal Assessment:10 Total:50 Introduces From June 2026
COURSE OUTCOME
As per Shivaji University Regular B. Sc structure

SHIVAJI UNIVERSITY, KOLHAPUR Syllabus as per National Education Policy (NEP) 2020 B.Sc. Food Science SEMESTER–VI IKS II Traditional and Functional Aspects of Indian Spices Credits: 2 Semester End 40 Internal Assessment:10 Total:50 Introduces From June 2026		
COURSE OUTCOME: students will able to: CO1 Explain the concept of Ahara (food) in Indian Knowledge Systems. CO2 Classify spices using Ayurvedic parameters (Rasa, Guna, Virya, Vipaka). CO3 Identify bioactive compounds and functional properties of major spices. CO4 Evaluate the relevance of traditional spice knowledge in modern functional food development.		
Unit No	Content	No of Hours
1	Foundations of IKS and Traditional Understanding of Spices - Indian Knowledge Systems and Food Philosophy Concept of Ahara as one of the three pillars (Trayopastambha) Panchamahabhuta theory and elemental composition of foods Tridosha (Vata, Pitta, Kapha) and digestive fire (Agni) Shad-Rasa (Six tastes) and physiological relevance Ritucharya (seasonal dietary practices) - Traditional Classification of Spices Definition and historical importance of Indian spices - Ayurvedic parameters: - Rasa (Taste) - Guna (Qualities) - Virya (Potency) - Vipaka (Post-digestive effect) Role of spices in digestion, immunity and metabolic balance Traditional spice formulations (Trikatu, Churna, Masala systems)	15
2	Functional and Scientific Aspects of Major Indian Spices - Turmeric (Haridra) - Ayurvedic properties - Curcuminoids and antioxidant activity - Role in immunity and inflammation management - Application in functional foods and nutraceuticals - Black Pepper (Maricha) - Agni stimulation and digestive enhancement - Piperine and bioavailability improvement - Use in traditional and modern formulations - Cinnamon (Tvak/Dalchini) - Warming properties and metabolic balance - Polyphenols and glycemic control	15

	• Antimicrobial activity 4. Cardamom (Ela) • Digestive and aromatic properties • Volatile oils and functional relevance • Applications in beverages and dairy systems	
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References:

1. Charaka Samhita – Ahara and Dravya concepts
2. Sushruta Samhita
3. K.V. Peter – *Handbook of Herbs and Spices*
4. Parthasarathy et al. – *Chemistry of Spices*
5. Ministry of AYUSH publications

SHIVAJI UNIVERSITY, KOLHAPUR
Syllabus as per National Education Policy (NEP) 2020
B.Sc. Food Science
SEMESTER-VI
Field Project (FP)
Credits: 2
Semester End 40 Internal Assessment:10 Total:50
Introduces From June 2026

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

Appendix I
GUIDE INTERACTION DIARY FORM

I, the undersigned Ms /Mr. _____ Roll No. _____
_____ studying in the _____ Year of _____ Full time Course is
doing my project work under the guidance of Dr./Ms./Mr.
_____, wish to state that I have met my Internal guide on the
following dates mentioned below for Project Guidance:-

Sr. No.	Date	Signature of Guide

Signature of the Candidate

Signature of Guide

SHIVAJI UNIVERSITY,KOLHAPUR Syllabus as per National Education Policy (NEP) 2020 B. Sc. Food Science SEMESTER–VI Major Practical VI (a) Lab Course XVII (Based on Major XI) Credits: 2 University Assessment: 50 Introduces From June 2026	
1	Preparation of plans for implementation of FSMS - HACCP, ISO: 22000
2	Prepare GMP audit of food processing lab
3	Preparation of SOP (Standard Operating Procedure)- Cleaning, Equipment
4	Identify biological, chemical & physical hazards
5	Preparation of HACCP Plan
6	Detection of hazards in a food processing area
7	Conduct an internal audit and maintain record

SHIVAJI UNIVERSITY,KOLHAPUR Syllabus as per National Education Policy (NEP) 2020 B. Sc. Food Science SEMESTER–VI Major Practical VI (b) Lab Course XVIII (Based on Major XII) Credits: 2 University Assessment: 50 Introduces From June 2026	
1	Determination of Sugar by Brix Method
2	Preparation of Fudge/ Fondant.
3	Preparation of caramel.
4	Development Indian traditional sweet.
5	Determination of moisture in cocoa powder.
6	Development of Hard boiled candy.
7	Inversion of Sugar
8	Study of Hygroscopicity of Sugar

SHIVAJI UNIVERSITY, KOLHAPUR
Syllabus as per National Education Policy (NEP) 2020
B. Sc. Food Science
SEMESTER–VI
Major Practical VI Lab Course XIX
Lab Course on Major Programme Elective II
1. Snack food processing lab
Credits: 2
University Assessment: 50
Introduces From June 2026

1	Preparation of Coated grains or nuts and its quality evaluation
2	Preparation of Puri and its quality evaluation.
3	Preparation of Chips and its quality evaluation.
4	Preparation of Puffed cereals (Churmura) and its quality evaluation.
5	Preparation of Roasted grains or nuts and its quality evaluation.
6	Preparation of Moong dal and its quality evaluation
7	Preparation of instant food premixes and its quality evaluation.

SHIVAJI UNIVERSITY,KOLHAPUR
Syllabus as per National Education Policy (NEP) 2020
B. Sc. Food Science
SEMESTER–VI
Major Practical VI Lab Course XIX
Lab Course on Major Programme Elective II
2. Food Refrigeration lab
Credits: 2
University Assessment: 50
Introduces From June 2026

1	Study of deep freezer
2	Study of food refrigerants
3	Study of cold storage conditions for different foods
4	Study of Food Preservation Applications
5	Study of Effect of refrigeration on microbial growth
6	Shelf-life study under refrigeration
7	Effect of Freezing on Food Quality

Theory Examination:

University Assessment for 40 Marks

B.Sc. Food Science

(Semester-)

Examination Course Name

(Course Code)

Day & Date:

Total Marks: 40

Time: 1.5 hr.

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.

[8]

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

Q.2 Answer the following Questions (Any 2 out of 3)

[16]

- 1.
- 2.
- 3.

Q.3 Answer the following Questions (Any 4 out of 6)

[16]

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

Practical Examination:

University Assessment for 50 Marks

B.Sc. Food Science II

(Semester-)

Examination

Course Name

(Course Code)

Day& Date:

Total Marks: 50

Time:

Q. 1 Performance and Experiment writing	25 Marks
Q. 2 Principle Writing	5 Marks
Q. 3 Viva	10 Marks
Q.4 Journal	10 Marks

University Assessment for 100 Marks

B.Sc. Food Science II

(Semester-)

Examination

Course Name

(Course Code)

Day& Date:

Total Marks: 100

Time:

Q. 1 A. Performance and Experiment writing	25 Marks
B. Performance and Experiment writing	25 Marks
Q. 2 Journal	20 Marks
Q. 3 Viva	20 Marks
Q.4 Write	10 Marks