



UNIVERSITY OF JAMMU

(NAAC ACCREDITED 'A' GRADE' UNIVERSITY)
Baba Sahib Ambedkar Road, Jammu-180006 (J&K)

NOTIFICATION

(21/Aug/Adp/46)

It is hereby notified for the information of all concerned that the Vice-Chancellor, in anticipation of the approval of the Academic Council, is pleased to authorize the adoption of the Syllabi and Courses of Study in the subject of **Food Science and Quality Control** for semesters Ist, IInd, IIIrd, IVth, Vth and VIth under the **Choice Based Credit System** at the **Undergraduate level** (as given in the **Annexure**) for the examinations to be held in the years indicated against each semester as under:-

Subject	Semester	For the examinations to be held in the year
Food Science and Quality Control	Semester-I	December 2022, 2023 and 2024
	Semester-II	May 2023, 2024 and 2025
	Semester-III	December 2023, 2024 and 2025
	Semester-IV	May 2024, 2025 and 2026
	Semester-V	December 2024, 2025 and 2026
	Semester-VI	May 2025, 2026 and 2027

The Syllabi of the courses is also available on the University website: www.jammuuniversity.ac.in

Sd/-

DEAN ACADEMIC AFFAIRS

No. F. Acd/H/21/ 4751-65

Dated: 28-11-2021

Copy for information and necessary action to:

1. Dean Faculty of Science
2. HOD/Convener, Board of Studies Home Science
3. All members of the Board of Studies
4. Principal, Govt. Degree College for women, Kathua.
5. C.A. to the Controller of Examinations
6. Director, Computer Centre, University of Jammu
7. Deputy Registrar/Asst. Registrar (Conf./Exams. U.G/Evaluation Non-Prof.)
8. Incharge University Website for necessary action please

Sumita Sharma
Deputy Registrar (Academic)

28/11/21
18/12/21

**Govt. Degree College for Women,
Kathua- 184101**

Proposed syllabus for course in Food Science and Quality Control (B.Sc.)

DISTRIBUTION AND WEIGHTAGE OF COURSES IN FOOD SCIENCE & QUALITY CONTROL AS A DISCIPLINE OF B. Sc. (GENERAL) UNDER CHOICE BASED CREDIT SYSTEM SCHEME AT UNDER-GRADUATE LEVEL

Semester	Course Code/Type of Course	Title of Course	Credits	
			T	P
I	UFSTC101 UFSPC102 CORE (6 Credits)	Food Chemistry & Nutrition	4	2
II	UFSTC201 UFSPC202 CORE (6 Credits)	Introductory Food Microbiology	4	2
III	UFSTC301 UFSPC302 CORE (6 Credits)	Principles of Food Processing	4	2
	Skill Enhancement Course UFSTS303	Technology of processing of fruits & vegetables	4	
IV	UFSTC401 UFSPC402 CORE (6 Credits)	Processing Foods of Plant Origin	4	2
	Skill Enhancement Course UFSTS403	Basic Bakery Technology and Entrepreneurship	4	
DISCIPLINE SPECIFIC ELECTIVE COURSES: 6 (4+2) Credits				
V a Or	UFSTE501 UFSPE502	Food Quality Assurance & Packaging	4	2
Vb	or UFSTE503 UFSPE504 DSE (6 Credits)	Handling & Storage of Agricultural Produce	4	2
	Skill Enhancement Course UFSTS505	Technology of Processing of Milk and Milk Products	4	
VI a Or	UFSTE601 UFSPE602	Processing of Foods of Animals Origin	4	2
VI b	or UFSTE603 UFSPE604 DSE-(6 Credits)	Advances in Food Processing and Food Analysis	4	2
	Skill Enhancement Course UFSTS605	Food Product Development and Entrepreneurship	4	

FOOD SCIENCE & QUALITY CONTROL

B. Sc.-I- SEMESTER

Syllabi for the examinations to be held in the years Dec. 2022, 2023 and 2024

Course Code: UFSTC101

TITLE: FOOD CHEMISTRY AND NUTRITION

CREDITS: THEORY-4, PRACTICAL -2

MAXIMUM MARKS: 100

EXTERNAL EXAMINATION: 80

INTERNAL ASSESSMENT: 20

THEORY (4 CREDITS): 60 HOURS

DURATION: 2hrs 30 min

Objectives/Expected Learning:

- To provide understanding of chemistry of major components of food
- To provide understanding of role of macro and micro nutrients in human health

UNIT- 1

(12 HOURS):

Introduction to Food Chemistry and Nutrition

- Definitions & concepts: Food, food chemistry, nutrition, nutrients, adequate nutrition, malnutrition.
- Importance of food chemistry.
- Recommended dietary intake (RDI), Basal metabolism (BM), factors affecting RDI and BM.
- Classification of foods.
- Water in foods: Concept of water-solute interactions, Water activity and its relation with shelf-life of foods.

UNIT – 2

(12 HOURS)

Macronutrients

- Carbohydrates: Definition, chemistry, classification, sources, properties. Nutritional and industrial importance. Starch gelatinization and retrogradation. Use of polysaccharides in food industry.
- Proteins: Definition, chemistry, classification, sources, properties, chemical makeup and industrial importance.
- Non enzymatic browning reactions in foods- Caramelization and Maillard reaction.
- Fats: Definition, sources, chemistry, properties and rancidity. Significance of MUFAS and PUFAS.

UNIT- 3

(12 HOURS)

Micronutrients

- Vitamins: Importance, sources; fat soluble and water soluble vitamins.
- Effect of processing and storage on vitamins.
- Minerals: Importance and sources.
- Enzymes: Definition, sources, classification; Application in food processing, Enzymatic browning in foods and its control.

FOOD SCIENCE & QUALITY CONTROL
B. Sc.-I- SEMESTER

Syllabi for the examinations to be held in the years Dec.2022, 2023 and 2024

Course Code: UFSTC101

TITLE: FOOD CHEMISTRY AND NUTRITION

UNIT- 4

(12 HOURS)

Functional Foods

- Functional foods: Definition & classification.
- Dietary fibre and its role in disease prevention.
- Antioxidants: Sources and role in health.

UNIT- 5

(12 HOURS)

Pigments, Minerals and Vitamins

- Pigments: Myoglobin, chlorophyll, anthocyanin and carotenoids: their sources and stability during processing.
- Mineral functions, sources, Bio-availability, and deficiency of following minerals – calcium, Iron, Iodine, Fluorine, sodium, potassium. Vitamins – Classification, units of measurement, sources, functions.
- Deficiency about following vitamins: Fats soluble vitamins – vitamin A, D, E and K. Water soluble vitamins – vitamin B-complex. Fortification, Enrichment and Restoration of nutrients.

References :

1. Sunitra Roday, Food Science and Nutrition, 3rd Edition, 2018
 2. Sumati R Mudambi, Rajagopal M. V Fundamentals of Foods, Nutrition and Diet Therapy, 6th Edition, New Age International Publishers, 2010
 3. Srilakshmi, B, Nutrition Science, New age international (P) Ltd publishers, New Delhi, 2016.
 4. Swaminathan, M. Advanced Text book on food and Nutrition, Vol.I. Bangalore Printing and Publishing Co. Ltd Bangalore.
 5. H.-D. Belitz, Werner Grosch, Peter Schieberle, Food Chemistry, 3rd Edition, Springer-Verlag Berlin Heidelberg, 2004
 6. John M. deMan, John W. Finley, W Jeffrey Hurst, Chang Yong Lee, Principles of Food Chemistry, 4th Edition, Springer, 2018
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FOOD SCIENCE & QUALITY CONTROL

B. Sc.-I- SEMESTER

Syllabi for the examinations to be held in the years Dec.,2022, Dec.,2023 and Dec.,2024

Course Code: UFSTC101

TITLE: FOOD CHEMISTRY AND NUTRITION

Note for paper setters

External End Semester Examination (Total marks: 80)

Time duration: 2hrs 30 min

The question paper will have 3 sections.

Section I: Five (5) short answer questions representing all units i.e. at least one from each unit (without detailed explanation having 70-80 words) of 3 marks each = 15 marks (All compulsory)

Section II: Five (5) medium answer questions (with explanation having 250-300 words) of 7 marks each = 35 marks (All compulsory)

Section III: Five (5) long answer questions (with detailed explanation/ of 500-600 words) covering all the units. The candidate will be required to answer only two questions of 15 marks each = 30 marks.

Internal Assessment (Total Marks:20)

Time duration:1 hr

The internal assessment under CBCS shall comprise of two parts

Part A: Total weightage to this part shall be 10 marks. It will have eight short answer questions, selecting at least three from each of the two/three units/50% of the syllabus covered. A candidate has to attempt **any five** questions of two marks each.

Part B: Total weightage to this part shall be 10 marks. It will have two long answer questions, selecting at least each one from each of the two / three units/50% of the syllabus covered. A candidate has to attempt **any one** question of 10 marks.

FOOD SCIENCE & QUALITY CONTROL

B. Sc.-I- SEMESTER

Syllabi for the examinations to be held in the years Dec.,2022, Dec.,2023 and Dec.,2024

**Title: Laboratory Course based on
Food Chemistry and Nutrition
Credits: 2**

**Course Code: UFSPC102
Total Marks: 50
Internal Examination: 25 marks
End Semester Examination: 25 marks**

- Preparation and standardization of solutions.
- Determination of moisture content.
- Determination of ash content.
- Qualitative and quantitative tests for proteins.
- Determination of crude fat.
- Proximate Composition of Food.
- Qualitative and quantitative tests of carbohydrates.
- Determination of crude fibre.
- Determination of free fatty acid and acid value.
- Determination of peroxide value

Scheme of Examination:

Examination (Practical)

Daily evaluation of practical records/
Viva-Voce/ attendance etc.

Syllabus to be covered in the examination % Weightage (marks)

Final Practical Performance + Viva voce 100%
(External Examination)

50% (25 Marks including 5 for attendance, 5 for Viva-voce and 15 marks (5 for Test + 10 marks daily performance))

50% (25 Marks including 20 for external paper and 5 marks for Viva voce)

Total

50 marks

FOOD SCIENCE & QUALITY CONTROL

B. Sc.-II- SEMESTER

Syllabi for the examinations to be held in the years May 2023, Dec.,2024 and May,2025

Course Code: UFSTC201

TITLE: Introductory Food Microbiology

MAXIMUM MARKS: 100

EXTERNAL EXAMINATION: 80

INTERNAL ASSESSMENT: 20

CREDITS: THEORY-4, PRACTICAL -2

THEORY (4 CREDITS): 60 HOURS

DURATION: 2hrs 30 min

Objectives/Expected Learning:

To provide knowledge of different microorganisms associated with food and their role in spoilage and preservation of food.

UNIT – 1

(12 HOURS)

Introduction to Microbiology

- History and scope of microbiology.
- Distribution of microorganisms.
- Microbial growth curve.
- Factors effecting microbial growth – extrinsic and intrinsic factors.

UNIT- 2

(12 HOURS)

Introduction to Microbes

- Bacteria: Structure, classification.
- Fungi: Structure and classification, harmful and beneficial fungi, mycotoxins.
- Viruses: Structure and classification.
- Economic importance of bacteria, fungi and virus.

UNIT – 3

(12 HOURS)

Microbial Spoilage of Foods

- Microbial spoilage of fresh foods-fruits, vegetables, cereals, pulses.
- Spoilage of meat and milk.
- Microbial spoilage of canned food
- Microbiological hazards associated with foods-Botulism, Salmonellosis, mycotoxins

UNIT – 4

(12 HOURS)

Industrial Microbiology

- Industrial microbiology-scope and development
- Fermented food and their benefits: sauerkraut, yoghurt, cheese, miso, tempeh
- Industrial production of enzymes and single cell protein

UNIT – 5

(12 HOURS)

Fermentation

- Fermented food and their benefits: sauerkraut, Olives, Gherkins, yoghurt, cheese, miso, tempeh
- Probiotics and their health benefits

FOOD SCIENCE & QUALITY CONTROL

B. Sc.-II- SEMESTER

Syllabi for the examinations to be held in the years May 2023, Dec.,2024 and May,2025

Course Code: UFSTC201

TITLE: Introductory Food Microbiology

References:

1. FOSTER W.M, Food Microbiology, (2020), CBS Publisher
2. Jay, J.M., Lossner, M.J and Golden, D.A. (2008). Modern Food Microbiology. 7th edition. Springer.
3. Adams, M.R and Moss, M.O. (2018). Food Microbiology. New Age International Pvt. LTd. Publishers.
4. Ray, B., Bunia, A., (2007), Fundamental Food Microbiology 4th Edition, Taylor & Francis Ltd
5. William C. Frazier, Dennis C. Westhoff, N.M. Vanitha., Food Microbiology, 5th Edition (2017), McGraw Hill Education Publisher

Note for paper setters

External End Semester Examination (Total marks: 80)

Time duration: 2hrs 30 min

The question paper will have 3 sections.

Section I: Five (5) short answer questions representing all units i.e. at least one from each unit (without detailed explanation having 70-80 words) of 3 marks each = 12 marks (All compulsory)

Section II: Five (5) medium answer questions (with explanation having 250-300 words) of 7 marks each = 35 marks (All compulsory)

Section III: Five (5) long answer questions (with detailed explanation/ of 500-600 words) covering all the units. The candidate will be required to answer only two questions of 15 marks each = 30 marks.

Internal Assessment (Total Marks:20)

Time duration: 1 hr

The internal assessment under CBCS shall comprise of two parts

Part A: Total weightage to this part shall be 10 marks. It will have eight short answer questions, selecting at least three from each of the two/three units/50% of the syllabus covered. A candidate has to attempt **any five** questions of two marks each.

Part B: Total weightage to this part shall be 10 marks. It will have two long answer questions, selecting at least each one from each of two / three units/50% of the syllabus covered. A candidate has to attempt **any one** question of 10 marks.

FOOD SCIENCE & QUALITY CONTROL:

B. Sc.-II- SEMESTER (Under CBCS at Undergraduate Level)

Syllabi for the examinations to be held in the years May,2023, May,2024 and May,2025

Title: Laboratory Course based on

Introductory Food Microbiology

Credits: 2

Course Code: UFSPC202

Total Marks: 50

Internal Examination: 25 marks

End Semester Examination: 25 marks

1. Microscope: Types and working of microscope
2. Cleaning and sterilization of glassware
3. Demonstration of sterilization of equipments
4. Preparation of nutrient agar medium
5. Enumeration of microbes from food samples
6. Inoculation techniques
7. Gram staining
8. Identification of bacteria on the basis of:
 - Cultural characteristics
 - Morphological characteristics
9. Enumeration of micro-organisms-TPC
10. Demonstration and identification of permanent slides

Scheme of Examination:

Examination (Practical)

Daily evaluation of practical records/

Viva-Voce/ attendance etc.

Syllabus to be covered in the examination % Weightage (marks)

50% (25 Marks including 5 for attendance, 5 for Viva-voce and 15 marks (5 for Test + 10 marks daily performance))

Final Practical Performance + Viva voce 100%
(External Examination)

50% (25 Marks including 20 for external paper and 5 marks for Viva voce)

Total

50 marks

FOOD SCIENCE & QUALITY CONTROL

B. Sc.-III- SEMESTER

Syllabi for the examinations to be held in the years Dec 2023, Dec.,2024 and Dec,2025

Course Code: UFSTC301

TITLE: Principles of Food Processing

CREDITS: THEORY-4, PRACTICAL -2

MAXIMUM MARKS: 100

EXTERNAL EXAMINATION: 80

INTERNAL ASSESSMENT: 20

THEORY (4 CREDITS): 60 HOURS

DURATION: 2hrs 30 min

Objectives/Expected Learning:

To acquaint the students about the concepts and technologies of processing and preservation of foods

Unit – 1

(12 HOURS)

- Status of Indian food industry with emphasis on Jammu and Kashmir.
- Classification of foods on basis of shelf life, pH, origin.
- Importance of food processing and preservation

Unit – 2

(12 HOURS)

- Different types of food spoilage viz. Microbiological, Biochemical and Physical and their effects on food quality.
- Preservation by low temperature: Refrigeration; refrigeration systems. Freezing process- slow and fast freezing, Types of freezers. Storage and thawing of frozen food.
- Preservation by high temperature: Pasteurization, sterilization, canning and aseptic processing.

Unit – 3

(12 HOURS)

- Principles of preservation by evaporation, concentration, drying and dehydration.
- Principle of preservation by sugar and salt.
- Preservation of foods by chemical preservatives. Types of chemical preservatives used in different food products.

Unit – 4

(12 HOURS)

- Intermediate moisture food (IMF).
- Fermentation and its types
- Irradiation of foods: Mechanism, doses of irradiation, its effect on food quality.

FOOD SCIENCE & QUALITY CONTROL
B. Sc.-III- SEMESTER

Syllabi for the examinations to be held in the years Dec 2023, Dec.,2024 and Dec,2025

Course Code: UFSTC301

TITLE: Principles of Food Processing

Unit – 5

(12 HOURS)

New and unconventional methods of food processing:

- High pressure processing technology
- Infra-red (IR) technique
- Microwave heating o Pulse electric field processing
- Membrane processing

References:

1. N Shakuntala Manay, M. Shadaksharaswamy., Foods Facts And Principles, 4th Edition, New Age International Publishers, 2020
2. P.J.Fellows., Food Processing Technology, (2016) 4th Edition, Woodhead Publishing
3. Stephanie Clark, Stephanie Jung, Buddhi Lamsal Food Processing: Principles and Applications, 2nd Edition (2014), Wiley Blackwell.
4. Bawa. A.S, O.P Chauhan etal. Food Science. New India Publishing agency, 2013
5. Roday,S. Food Scienc e, Oxford publication, 2011
6. Norman N Potter, H.H. Joseph., Food Science, 5th Edition (2007)

Note for paper setters

External End Semester Examination (Total marks: 80)

Time duration: 2hrs 30 min

The question paper will have 3 sections.

Section I: Five (5) short answer questions representing all units i.e. at least one from each unit (without detailed explanation having 70-80 words) of 3 marks each = 15 marks (All compulsory)

Section II: Five (5) medium answer questions (with explanation having 250-300 words) of 7 marks each = 35 marks (All compulsory)

Section III: Five (5) long answer questions (with detailed explanation/ of 500-600 words) covering all the units. The candidate will be required to answer only two questions of 15 marks each = 30 marks.

Internal Assessment (Total Marks:20)

Time duration: 1 hr

The internal assessment under CBCS shall comprise of two parts

Part A: Total weightage to this part shall be 10 marks. It will have eight short answer questions, selecting at least three from each of the two/three units/50% of the syllabus covered. A candidate has to attempt **any five** questions of two marks each.

Part B: Total weightage to this part shall be 10 marks. It will have two long answer questions, selecting at least each one from each of two / three units/50% of the syllabus covered. A candidate has to attempt **any one** question of 10 marks

FOOD SCIENCE & QUALITY CONTROL

B. Sc.-III- SEMESTER (Under CBCS at Undergraduate Level)

Syllabi for the examinations to be held in the years December 2023, 2024, 2025

**Title: Laboratory Course based on
Principles of Food Processing
Credits: 2**

Course Code: UFSPC302

Total Marks: 50

Internal Examination: 25 marks

End Semester Examination: 25 marks

1. Identification of common microbial disorders of foods- Black mold rot, Green mold rot, Yeast growth, Bread mold, Spoilage of canned foods.
2. Alkaline phosphatase test for pasteurized milk
3. Drying of vegetables and calculation of dehydration/rehydration ratio.
4. Preparation of pickles and estimation of acidity.
5. To study Canned food Product
6. Preparation and preservation of Fruit jam.
7. Visit to food industries to study preparation of processed products

Scheme of Examination:

Examination (Practical)

Daily evaluation of practical records/

Viva-Voce/ attendance etc.

Syllabus to be covered in the examination % Weightage (marks)

50% (25 Marks including 5 for attendance, 5 for Viva-voce and 15 marks (5 for Test + 10 marks daily performance)

Final Practical Performance + Viva voce 100%
(External Examination)

50% (25 Marks including 20 for external paper and 5 marks for Viva voce)

Total

50 marks

FOOD SCIENCE & QUALITY CONTROL

B. Sc.-III- SEMESTER Skill Enhancement Course

Syllabi for the examinations to be held in the years Dec.2023, 2024 and 2025

Course Code: UFSTS303

**TITLE: TECHNOLOGY OF FRUITS & VEGETABLES
MAXIMUM MARKS: 100**

CREDITS:THEORY (4 CREDITS): 60 HOURS

DURATION: 2hrs 30 min

EXTERNAL EXAMINATION: 80

INTERNAL ASSESSMENT: 20

Objectives:

1. To provide an understanding of composition of various fruits and vegetables.
2. To familiarize students with changes occurring in various fruits and vegetables as a result of processing and cooking.

Unit-I

(12 HOURS)

History and need of preservation, reasons of spoilage. Chemical changes in fruits and vegetables. Principles and methods of fruits and vegetables preservation (short & long), low temp. preservation, high temp. preservation, Dehydration(Sun drying & mechanical dehydration, process variation for fruits and vegetables, packing and storage) , irradiation.

Unit-II

(12 HOURS)

Technology of processing of juices (selection , juice extraction, deaeration, straining, filtration and clarification) preservation of fruit juices (pasteurization, chemically preserved with sugars, freezing, drying, carbonation). Processing of cordials, nectar.

Unit-III

(12 HOURS)

Introduction to jams: Constituents, selection of fruits, processing and technology. Jelly: Essential constituents (role of pectin, ratio) theory of jelly formation, processing & technology, defects in jelly. Marmalades: Types, processing & technology, defects .Tomato products, chutney, sauce, pickles, preserves and candied fruits and packaging

Unit-IV

(12 HOURS)

Technology of post harvest handling. Composition and related quality factors for processing. Canning of fruits and vegetables : Selection of fruits and vegetables, process of canning. , factors affecting the process-time and temperature, containers of packing, lacquering, syrups and brines for canning, spoilage in canned foods.

FOOD SCIENCE & QUALITY CONTROL

B. Sc.-III- SEMESTER

Skill Enhancement Course

Syllabi for the examinations to be held in the years Dec.2023, 2024 and 2025

Course Code: UFSTS303

TITLE: TECHNOLOGY OF FRUITS & VEGETABLES

Unit V

Vinegar: General methods of preparation and uses. Importance of fruits and vegetable, Nutritive quality of fruits and vegetables, role of fruits and vegetables in the diet. Utilization of wastes from fruits and vegetables industry. Laws and standards relevant to fruit & vegetable processing and preservation.

REFERENCES

1. Girdhari Lal, Siddappa, G.S and Tandon, G.L.1998. Preservation of fruits & Vegetables, ICAR, New Delhi.
2. W B Crusess.2004. Commercial Unit and Vegetable Products, W.V. Special Indian Edition, Pub: Agrobios India
3. Manay, S. & Shadaksharaswami, M.2004. Foods: Facts and Principles, New Age Publishers
4. Ranganna S.1986. Handbook of analysis and quality control for fruits and vegetable products, 2nd ed.Tata McGraw-Hill publishing company limited.
5. Srivastava, R.P. and Kumar, S. 2006. Fruits and Vegetables Preservation- Principles and Practices. 3rd ed. International Book Distributing Co.
6. Srilakshmi.B. 2012 Food Science. 3rd ed. New age international publishers.

Note for paper setters

External End Semester Examination (Total marks: 80)

Time duration: 2hrs 30 min

The question paper will have 3 sections.

Section I: Five (5) short answer questions representing all units i.e. at least one from each unit (without detailed explanation having 70-80 words) of 3 marks each = 15 marks (All compulsory)

Section II: Five (5) medium answer questions (with explanation having 250-300 words) of 7 marks each = 35 marks (All compulsory)

FOOD SCIENCE & QUALITY CONTROL

B. Sc.-III- SEMESTER

Skill Enhancement Course

Course Code: UFSTS303

TITLE: TECHNOLOGY OF FRUITS & VEGETABLES

Section III: Five (5) long answer questions (with detailed explanation/ of 500-600 words) covering all the units. The candidate will be required to answer only two questions of 15 marks each = 30 marks.

Internal Assessment (Total Marks:20)

Time duration:1 hr

The internal assessment under CBCS shall comprise of two parts

Part A: Total weightage to this part shall be 10 marks. It will have eight short answer questions, selecting at least three from each of the two/three units/50% of the syllabus covered. A candidate has to attempt **any five** questions of two marks each.

Part B: Total weightage to this part shall be 10 marks. It will have two long answer questions, selecting at least each one from each of two / three units/50% of the syllabus covered. A candidate has to attempt any one question of 10 marks.

FOOD SCIENCE & QUALITY CONTROL

B. Sc.-IV- SEMESTER

Syllabi for the examinations to be held in the years ~~May 2023~~ May 2024 and May 2025
and May 2026

Course Code: UFSTC401

TITLE: Processing Foods of Plant Origin

CREDITS: THEORY-4, PRACTICAL -2

MAXIMUM MARKS: 100

EXTERNAL EXAMINATION: 80

INTERNAL ASSESSMENT: 20

THEORY (4 CREDITS): 60 HOURS

DURATION: 2hrs 30 min

Objectives/Expected Learning:

To make the students understand about production, composition and processing of various staple food crops
To acquaint the students about production, post-harvest physiology and processing of different fruits and vegetables

Unit – 1

(12 MARKS)

- Production trends of different cereals.
- Chemical composition and nutritional significance of cereals, pulses and oils seeds.
- Structure of cereal grains-wheat, rice and maize.

Unit – 2

(12 MARKS)

- Milling of wheat and rice
- Status of bakery Industry in India
- Requirements of setting a bakery plant.
- Specification of raw materials for bakery industry-flour, sugar, shortenings, yeast, salt.
- Additives used in bakery products, flour improvers and bleaching agents
- Manufacturing of bakery products-bread, biscuits and cakes.

Unit –3

(12MARKS)

- Nutritional significance of fruits and vegetables.
- Post-harvest loses in fruits and vegetables.
- Post-harvest physiology and handling of fruits and vegetables, respiration, transpiration, etc.

Unit – 4

(12 MARKS)

- Maturity and ripening.
- Packaging requirements of fruits & vegetables. Storage of fruits and vegetables. Refrigerated and controlled atmospheric storage • Processed products of fruits and vegetables (jam, jelly, marmalade, sauce and pickles).
- Beverages: Juice, nectar, squash, cordial, concentrate

FOOD SCIENCE & QUALITY CONTROL

B. Sc.-IV- SEMESTER

Syllabi for the examinations to be held in the years ~~May 2023~~ May 2024 and May 2025 and May 2026

Course Code: UFSTC401

TITLE:

Processing Foods of Plant Origin

Unit – 5

(12 MARKS)

- Specifications of various fruit and vegetable products.
- Tomato products-puree, ketchup, cocktail.
- Processing of Mushrooms.
- Dehydration, freezing and canning of fruits and vegetables.
- Requirements for a fruit and vegetable based processing plant.

References:

1. R.P. Srivastva, S. Kumar., Fruit & Vegetable Preservation, 3rd Edition (2019), CBS Publishers
2. Kurt A. Rosentrater, A.D.Evers., Kent's Technology of Cereals, 5th Edition, Woodhead Publishing (2018)
3. P.J.Fellows., Food Processing Technology, (2016) 4th Edition, Woodhead Publishing
4. Norman N Potter, H.H. Joseph., Food Science, 5th Edition (2007)
5. Girdhari Lal, Siddhapa & Tandon, Preservation of Fruits and Vegetables, Bombay Popular Prakashan.
6. S.C. Dubey, Basic Baking,

Note for paper setters

External End Semester Examination (Total marks: 80)

Time duration: 2hrs 30 min

The question paper will have 3 sections.

Section I: Five (5) short answer questions representing all units i.e. at least one from each unit (without detailed explanation having 70-80 words) of 3 marks each = 15 marks (All compulsory)

Section II: Five (5) medium answer questions (with explanation having 250-300 words) of 7 marks each = 35 marks (All compulsory)

Section III: Five (5) long answer questions (with detailed explanation/ of 500-600 words) covering all the units. The candidate will be required to answer only two questions of 15 marks each = 30 marks.

Internal Assessment (Total Marks:20)

Time duration:1 hr

The internal assessment under CBCS shall comprise of two parts

Part A: Total weightage to this part shall be 10 marks. It will have eight short answer questions, selecting at least three from each of the two/three units/50% of the syllabus covered. A candidate has to attempt **any five** questions of two marks each.

Part B: Total weightage to this part shall be 10 marks. It will have two long answer questions, selecting at least each one from first two / three units/50% of the syllabus covered. A candidate has to attempt **any one** question of 10 marks

FOOD SCIENCE & QUALITY CONTROL

B. Sc.-IV- SEMESTER (Under CBCS at Undergraduate Level)

Syllabi for the examinations to be held in the years May 2024, 2025, 2026

**Title: Laboratory Course based on
Processing Foods of Plant Origin
Credits: 2**

Course Code: UFSPC402

Total Marks: 50

Internal Examination: 25 marks

End Semester Examination: 25 marks

1. Quality tests of wheat grain.
2. Quality tests of rice grain
3. Evaluation of bakery products (e.g. Bread/Cake/Biscuits)
4. Preparation of preserves.
5. Preparation of squash.
6. Preparation of tomato sauce/ketchup
7. Preparation of syrup & brine solutions
9. Cut out analysis of canned fruits & vegetables.
10. Project formulation for a fruit/vegetable/cereal based processing plant.

Scheme of Examination:

Examination (Practical)

Daily evaluation of practical records/

Viva-Voce/ attendance etc.

Syllabus to be covered in the examination % Weightage (marks)

50% (25 Marks including 5 for attendance, 5 for Viva-voce & Project Report and 15 marks (5 for Test + 10 marks daily performance)

Final Practical Performance + Viva voce 100%
(External Examination)

50% (25 Marks including 20 for external paper and 5 marks for Viva voce)

Total

50 marks

FOOD SCIENCE & QUALITY CONTROL

B. Sc.-IV- SEMESTER

Skill Enhancement Course

Syllabi for the examinations to be held in the years ~~Dec. 2023, 2024 and 2025~~ ^{May - 2024, 2025 + 2026}

Course Code: UFSTS403

TITLE:

BASIC BAKERY TECHNOLOGY AND
ENTREPRENEURSHIP

CREDITS:THEORY (4 CREDITS): 60 HOURS

DURATION: 2hrs 30 min

MAXIMUM MARKS: 100

EXTERNAL EXAMINATION: 80

INTERNAL ASSESSMENT: 20

Objectives:

1. To provide an understanding of composition of cereals
2. To familiarize students with changes occurring in various baked products as a result of processing.
3. To enable students to use the theoretical knowledge in various applications and food preparations.

Unit-I

(12 HOURS)

History of Bakery, - Present Trends - Prospects - Nutrition facts of Bakery.

Raw materials used in Bakery - Flour : Types of flour ,Flour characteristics.

Wheat: Structure and Composition of wheat, Varieties of Wheat, Wheat products - Whole wheat flour, Maida, semolina, Role of Gluten

Unit-II

(12 HOURS)

Yeast, Yeast Production - Enzymes - their functions in dough, Sugar and Milk - Properties and Role of milk and Sugar in Bakery, Leavening, flavouring, Nuts and fruits - their function in bread making, Cocoa and Chocolate

Unit-III

(12 HOURS)

Types of breads, bread faults and remedies. Biscuits: Ingredients - Types of biscuits - Processing of biscuits - faults & Remedies. Cream crackers, soda crackers, wafer biscuits & matzos, puff biscuits Short dough biscuits, Wafers, Cakes - types - Ingredients - Processing of cakes - Problems - Remedies Pizza and pastries - their ingredients and Processing

Unit-IV

(12 HOURS)

Setting up of a Bakery Unit - Bakery equipment required - types - Selection – Maintenance - Bakery norms and Standards, materials of construction of Food Equipments. Illumination and ventilation. Cleaning & sanitization Maintenance of Food Plant Building : Safety Color Code, Roof Inspection, Care of Concrete floors

FOOD SCIENCE & QUALITY CONTROL

B. Sc.-IV- SEMESTER

Skill Enhancement Course

Syllabi for the examinations to be held in the years

May 2024, 2025 & 2026
~~Dec-2023, 2024 and 2025~~

Course Code: UFSTS403

TITLE: BASIC BAKERY TECHNOLOGY AND
ENTREPRENEURSHIP

Unit-V

(12 HOURS)

Indian traditional baked products Modified bakery Modification of bakery products for people with special nutritional requirements e.g. high fibre, low sugar, low fat, gluten free bakery products.

REFERENCES

1. Kurt A. Rosentrater, A.D.Evers., Kent's Technology of Cereals, 5th Edition, Woodhead Publishing (2018)
2. P.J.Fellows., Food Processing Technology, (2016) 4th Edition, Woodhead Publishing
3. Cereals and Cereal Processing: Chemistry and Technology DAV Dendy & BJ
4. Chemistry and Technology of Cereal Food and Feed S A Matz
5. Bakery Technology and Engineering S A Matz
6. Bakery Flour Confectionary L J Hanneman
7. Baking Science Technology E J Pyle

Note for paper setters

External End Semester Examination (Total marks: 80)

Time duration: 2hrs 30 min

The question paper will have 3 sections.

Section I: Five (5) short answer questions representing all units i.e. at least one from each unit (without detailed explanation having 70-80 words) of 3 marks each = 15 marks (All compulsory)

Section II: Five (5) medium answer questions (with explanation having 250-300 words) of 7 marks each = 35 marks (All compulsory)

FOOD SCIENCE & QUALITY CONTROL

B. Sc.-IV- SEMESTER

Skill Enhancement Course

Syllabi for the examinations to be held in the years ~~Dec 2023, 2024 and 2025~~ ^{May 2024, 2025 + 2026}

CREDITS: THEORY-4

THEORY (4 CREDITS): 60 HOURS

Course Code: UFSTS403

TITLE: BASIC BAKERY TECHNOLOGY AND
ENTREPRENEURSHIP

Section III: Five (5) long answer questions (with detailed explanation/ of 500-600 words) covering all the units. The candidate will be required to answer only two questions of 15 marks each = 30 marks.

Internal Assessment (Total Marks:20)

Time duration:1 hr

The internal assessment under CBCS shall comprise of two parts

Part A: Total weightage to this part shall be 10 marks. It will have eight short answer questions, selecting at least three from each of the two/three units/50% of the syllabus covered. A candidate has to attempt **any five** questions of two marks each.

Part B: Total weightage to this part shall be 10 marks. It will have two long answer questions, selecting at least each one from each of two / three units/50% of the syllabus covered. A candidate has to attempt **any one** question of 10 marks.

FOOD SCIENCE & QUALITY CONTROL

B. Sc.-V- SEMESTER

Syllabi for the examinations to be held in the years December 2024, 2025, 2026

DISCIPLINE SPECIFIC ELECTIVE (DSE)

OPTION-I

Course Code: UFSTE501

TITLE: Food Quality Assurance & Packaging

MAXIMUM MARKS: 100

EXTERNAL EXAMINATION: 80

INTERNAL ASSESSMENT: 20

CREDITS: THEORY-4, PRACTICAL -2

THEORY (4 CREDITS): 60 HOURS

DURATION: 2hrs 30 min

Objectives/Expected Learning:

To make students understand about food quality and its evaluation.

To acquaint students about packaging requirements of food and properties of different packaging materials used in food packaging

Unit – 1

(12 HOURS)

- Sampling-Definition and types.
- Establishment of quality control laboratory.
- Hazard Analysis Critical Control Point (HACCP), Good Manufacturing Practices (GMP).
- Introduction of National and International Food laws.
- Food Safety and Standards Act-2006.

Unit –2

(12 HOURS)

- Sensory evaluation of foods-Introduction; Sensory perception-Appearance, flavour, texture.
- Selection of sensory panellists.
- Classification of sensory tests.

Unit – 3

(12 HOURS)

- Refractometry: Basic principles and applications.
- Optical aspects of Colour (Tinto meter).
- Viscosity and Viscometers
- Spectroscopy- Principles and applications.
- Texture Analysis of Foods

Unit – 4

(12 HOURS)

- Packaging- definition and functions
- Properties of different packaging materials-glass, metal, polymers.
- Packaging requirements of various food-fruits, vegetables, spices, milk, meat and their processed products.

FOOD SCIENCE & QUALITY CONTROL

B. Sc.-V- SEMESTER

Syllabi for the examinations to be held in the years December 2024, 2025, 2026

DISCIPLINE SPECIFIC ELECTIVE (DSE)

OPTION-I

Course Code: UFSTE501

TITLE: Food Quality Assurance & Packaging

(12 HOURS)

Unit – 5

- Novel Food Packaging techniques- Active packaging, MA
- Food Packaging Laws and Regulations.
- Testing Procedures for Packaging Materials- thickness, tensile strength, puncture resistance, bursting strength, seal strength, water vapor permeability, Gas permeability, grease resistance

References:

1. Eram S. Rao., Food Quality Evaluation, Variety Books Publishers and Distributors (2013)
2. Pomeranz, Y. Food Analysis-Theory and Practice, Springer
3. Nielsen, Suzanne, Food Analysis, Springer US (2010)
4. Gordon Robertson, Food Packaging Principles, 3rd Edition (2013), CRC Press
5. Paine, Frank A., Paine, Heather Y, Food Packaging, 2nd Edition, Springer US
6. Dong Sun Lee, Kit L. Yam, Luciano Piergiovanni, Food Packaging Science and Technology, CRC Press

Note for paper setters

External End Semester Examination (Total marks: 80)

Time duration: 2hrs 30 min

The question paper will have 3 sections.

Section I: Five (5) short answer questions representing all units i.e. at least one from each unit (without detailed explanation having 70-80 words) of 3 marks each = 15 marks (All compulsory)

Section II: Five (5) medium answer questions (with explanation having 250-300 words) of 7 marks each = 35 marks (All compulsory)

Section III: Five (5) long answer questions (with detailed explanation/ of 500-600 words) covering all the units. The candidate will be required to answer only two questions of 15 marks each = 30 marks.

Internal Assessment (Total Marks:20)

Time duration:1 hr

The internal assessment under CBCS shall comprise of two parts

Part A: Total weightage to this part shall be 10 marks. It will have eight short answer questions, selecting at least three from each of the two/three units/50% of the syllabus covered. A candidate has to attempt **any five** questions of two marks each.

Part B: Total weightage to this part shall be 10 marks. It will have two long answer questions, selecting at least each one from each of two / three units/50% of the syllabus covered. A candidate has to attempt **any one** question of 10 marks

FOOD SCIENCE & QUALITY CONTROL

B. Sc.-V- SEMESTER (Under CBCS at Undergraduate Level)

DISCIPLINE SPECIFIC ELECTIVE (DSE)

OPTION-I

Syllabi for the examinations to be held in the years Dec., 2024, 2025, 2026

**Title: Laboratory Course based on
Food Quality Assurance & Packaging
Credits: 2**

**Course Code: UFSPE502
Total Marks: 50
Internal Examination: 25 marks
End Semester Examination: 25 marks**

PRACTICALS

1. To examine the quality of fruits & vegetables.
2. Sensory methods for measuring food attributes- Threshold Test and Rating tests.
3. Common adulterants in milk, chillies, honey and their detection.
4. Identification of different packaging materials.
5. Determination of shelf life of packaged foods
6. Working of spectrophotometer and Refractometer.
7. Visit to research labs and industries.

Scheme of Examination:

Examination (Practical)

Daily evaluation of practical records/
Viva-Voce/ attendance etc.

Syllabus to be covered in the examination % Weightage (marks)

50% (25 Marks including 5 for attendance, 5 for Viva-voce and 15 marks (5 for Test + 10 marks daily performance))

Final Practical Performance + Viva voce 100%
(External Examination)

50% (25 Marks including 20 for external paper and 5 marks for Viva voce)

Total

50 marks

FOOD SCIENCE & QUALITY CONTROL

B. Sc.-V- SEMESTER

Syllabi for the examinations to be held in the years Dec., 2024, 2025, 2026

DISCIPLINE SPECIFIC ELECTIVE (DSE)

OPTION-II

Course Code: UFSTE503

TITLE: HANDLING AND STORAGE OF
AGRICULTURE PRODUCE

CREDITS: THEORY-4, PRACTICAL -2

MAXIMUM MARKS: 100
EXTERNAL EXAMINATION: 80
INTERNAL ASSESSMENT: 20

THEORY (4 CREDITS): 60 HOURS

DURATION: 2hrs 30 min

Objectives/Expected Learning

To impart knowledge related to the storage requirements of fruits, vegetables and cereals.
To study the structure and design of storages for fruits, vegetables and cereals.

(12 HOURS)

Unit – 1

- Fruit maturity and ripening indices.
- Postharvest changes in fruits and vegetables.
- Ethylene biosynthesis, mode of action, inhibition of ethylene synthesis.
- Precooling and transport of horticultural commodities.
- Cold chain management.

(12 HOURS)

Unit – 2

- Storage: Definition & functions
- Types of storage: low cost and high cost storage systems
- Hypobaric storage • Zero energy cool chamber: Its construction and advantages.

(12 HOURS)

Unit – 3

- Controlled atmospheric storage.
- Construction of CA storage
- Role of different gases in CA storage and control of gases.
- CA storage requirements for various fruits and vegetables (Elementary idea).
- Adverse effects of CA storage on fruits and vegetables.

(12 HOURS)

Unit – 4

- Grain storage: Types of storages used for cereals; Solid-wall bins and silos for bulk storage; Reinforced concrete silos; Steel bins
- Bag storage of grains
- Losses during storage

FOOD SCIENCE & QUALITY CONTROL

B. Sc.-V- SEMESTER

Syllabi for the examinations to be held in the years Dec., 2024, 2025, 2026

DISCIPLINE SPECIFIC ELECTIVE (DSE)

OPTION-II

Course Code: UFSTE503

**TITLE: HANDLING AND STORAGE OF
AGRICULTURE PRODUCE**

Unit – 5

(12 HOURS)

- Insect control: Losses caused by insects and their management.
- Rodent and bird control in stores.
- Storage management, hygiene and safety

References:

1. Sajad A. W, K. Jasmeet, Raees U.H., Fruits and Their Roles in Nutraceuticals and Functional Foods (2021), CRC PRESS (Taylor and Francis group)
2. Chandra Gopala Rao., Engineering for Storage of Fruits and Vegetables, Elsevier (2016)
2. Verma & Joshi., Postharvest Technology of Fruits & Vegetables, Indus publications, New Delhi.
3. Rural Structures in the Tropics: Design and Development by Geoffrey C. Mrema, Lawrence O. Gumbe, Hakgamalang J. Chepete, Januarius O. Agullo, FAO.
4. Grain Storage Techniques by D.L. Proctor, FAO.
5. A.K. Thompson, Postharvest Technology of Fruit & Vegetables, Iowa State Pr
6. A. Keith Thompson., Controlled Atmosphere Storage of Fruits and Vegetables, 3rd Edition (2018), CABI

Note for paper setters

External End Semester Examination (Total marks: 80)

Time duration: 2hrs 30 min

The question paper will have 3 sections.

Section I: Five (5) short answer questions representing all units i.e. at least one from each unit (without detailed explanation having 70-80 words) of 3 marks each = 15 marks (All compulsory)

Section II: Five (5) medium answer questions (with explanation having 250-300 words) of 7 marks each = 35 marks (All compulsory)

Section III: Five (5) long answer questions (with detailed explanation/ of 500-600 words) covering all the units. The candidate will be required to answer only two questions of 15 marks each = 30 marks.

Internal Assessment (Total Marks:20)

Time duration:1 hr

The internal assessment under CBCS shall comprise of two parts

Part A: Total weightage to this part shall be 10 marks. It will have eight short answer questions, selecting at least three from each of the two/three units/50% of the syllabus covered. A candidate has to attempt **any five** questions of two marks each.

Part B: Total weightage to this part shall be 10 marks. It will have two long answer questions, selecting at least one from each of the two / three units/50% of the syllabus covered. A candidate has to attempt **any one** question of 10 marks

FOOD SCIENCE & QUALITY CONTROL

B. Sc.-V- SEMESTER (Under CBCS at Undergraduate Level)

Syllabi for the examinations to be held in the years Dec., 2024, 2025, 2026

DSE OPTION-II

**Title: Laboratory Course based on
HANDLING AND STORAGE
OF AGRICULTURE PRODUCE
Credits: 2**

Course Code: UFSPE504

**Total Marks: 50
Internal Examination: 25 marks
End Semester Examination: 25 marks**

1. Maturity indices of different fruits and vegetables.
2. Identification of postharvest diseases and physiological disorders of fruits and vegetables.
3. MAP for any Fruit/Vegetable.
4. Visit to cold storage and controlled atmospheric stores
5. Checking of grains for insect infestation.
6. Visit to FCI godown.

Scheme of Examination:

Examination (Practical)

Daily evaluation of practical records/
Viva-Voce/ attendance etc.

Syllabus to be covered in the examination % Weightage (marks)

50% (25 Marks including 5 for attendance, 5 for Viva-voce and 15 marks (5 for Test + 10 marks daily performance))

Final Practical Performance + Viva voce 100%
(External Examination)

50% (25 Marks including 20 for external paper and 5 marks for Viva voce)

Total

50 marks

FOOD SCIENCE & QUALITY CONTROL:

B. Sc.-V- SEMESTER Skill Enhancement Course

Syllabi for the examinations to be held in the years Dec.2024, 2025 and 2026

Course Code: UFSTS505

**TITLE: TECHNOLOGY OF PROCESSING OF MILK
AND MILK PRODUCTS**

THEORY (4 CREDITS): 60 HOURS

DURATION: 2hrs 30 min

**MAXIMUM MARKS: 100
EXTERNAL EXAMINATION: 80
INTERNAL ASSESSMENT: 20**

Objectives:

1. To provide an understanding of composition of various milk and milk products.
2. To familiarize students with changes occurring in various milk and milk products as a result of processing and cooking.

Unit-I

(12 HOURS)

Development of milk processing industry in India present status & scope. Physico Chemical properties and nutritive value of milk, Microbiology of milk, source of contamination

Unit-II

(12 HOURS)

Liquid milk processing- Filtration/Clarification, Standardization, Pasteurization (Objectives, LTLT, UHT, equipments, advantages) Homogenization (Objectives, process, advantages) Packaging, Distribution and storage of liquid milk.

Unit-III

(12 HOURS)

Chemistry and Technology of cream, butter, margarine and ghee manufacture. Technology of: - Non-fat milk solid (Skim milk Powder) - Full Fat milk powder - Instant milk powder

Unit-IV

(12 HOURS)

Chemistry and technology of Cheese, other fermented products Fortification and enrichment of milk and milk products

Unit-V

(12 HOURS)

Introduction, Classification & Composition of byproducts By products of dairy industry and their utilization

REFERENCES

1. Surjit Mandal & Birendra Mishra Hati, Subrota, Dairy Product Technology: Recent Advances, Daya Publishing House (2020)

FOOD SCIENCE & QUALITY CONTROL:

B. Sc.-V- SEMESTER Skill Enhancement Course

Syllabi for the examinations to be held in the years Dec.2024, 2025 and 2026

Course Code: UFSTS505

**TITLE: TECHNOLOGY OF PROCESSING OF MILK
AND MILK PRODUCTS**

2. Aziz Homayouni, Dairy Science and Food Technology: Advances and Applications, Koros Press Limited (2017)
3. S. K. De, Outlines of Dairy Technology, Oxford Publication
4. H.V. Atherton & J.A. Newlander, Chemistry and Testing of Dairy products, AVI Publishing
5. Edger Spreer, Milk and dairy Product Technology, CRC Press

Note for paper setters

External End Semester Examination (Total marks: 80)

Time duration: 2hrs 30 min

The question paper will have 3 sections.

Section I: Five (5) short answer questions representing all units i.e. at least one from each unit (without detailed explanation having 70-80 words) of 3 marks each = 15 marks (All compulsory)

Section II: Five (5) medium answer questions (with explanation having 250-300 words) of 7 marks each = 35 marks (All compulsory)

Section III: Five (5) long answer questions (with detailed explanation/ of 500-600 words) covering all the units. The candidate will be required to answer only two questions of 15 marks each = 30 marks.

Internal Assessment (Total Marks:20)

Time duration: 1 hr

The internal assessment under CBCS shall comprise of two parts

Part A: Total weightage to this part shall be 10 marks. It will have eight short answer questions, selecting at least three from each of the two/three units/50% of the syllabus covered. A candidate has to attempt **any five** questions of two marks each.

Part B: Total weightage to this part shall be 10 marks. It will have two long answer questions, selecting at least each one from each of two / three units/50% of the syllabus covered. A candidate has to attempt **any one** question of 10 marks.

FOOD SCIENCE & QUALITY CONTROL

B. Sc.-VI- SEMESTER

Syllabi for the examinations to be held in the years May ~~2024~~ 2025, 2026 and 2027

DISCIPLINE SPECIFIC ELECTIVE (DSE)

OPTION-I

Course Code UFSTE601

**TITLE: PROCESSING OF FOODS OF ANIMAL
ORIGIN**

CREDITS: THEORY-4, PRACTICAL -2

MAXIMUM MARKS: 100

EXTERNAL EXAMINATION: 80

INTERNAL ASSESSMENT: 20

THEORY (4 CREDITS): 60 HOURS

DURATION: 2hrs 30 min

Objectives/Expected Learning:

To study the composition of milk and milk products.

To study the processing technology of milk and milk products

Unit – 1

(12 HOURS)

- Sources and composition of milk, nutritive value.
- Chemistry of Milk-Milk fat, proteins, lactose, vitamins, minerals & salts
- Processing of market milk- standardization, toning of milk, homogenization, Pasteurization, Sterilization.

Unit – 2

(12 HOURS)

- Storage, transportation and distribution of milk.
- Milk products - Processing of cream, condensed milk, whole and skimmed milk, fermented milks; Butter and its manufacture.
- Cheese and its types
- Production of Ice creams

Unit – 3

(12 HOURS)

- Introduction to Indian Meat, Fish and Poultry Industry.
- Scope and problems faced by meat industry in India.
- Structure of Muscle; Slaughtering of meat animals. Post mortem changes in meat.
- Tenderization and aging of meat.
- Different cuts of lamb and their uses.

Unit – 4

(12 HOURS)

- Preservation of meat by freezing, curing, pickling and smoking of meat.
- Traditional meat products of J&K.
- Preservation of fish by freezing, canning, smoking, irradiation and dehydration.

FOOD SCIENCE & QUALITY CONTROL

B. Sc.-VI- SEMESTER

Syllabi for the examinations to be held in the years May ~~2024~~, 2025, 2026 and 2027

DISCIPLINE SPECIFIC ELECTIVE (DSE)

OPTION-I

Course Code UFSTE601

TITLE: PROCESSING OF FOODS OF ANIMAL ORIGIN

Unit – 5

(12 HOURS)

- Structure, composition and nutritive value of eggs
- Packaging requirements of meat and meat products.
- Meat and Meat Product Laws

References:

1. Surjit Mandal & Birendra Mishra Hati, Subrota, Dairy Product Technology: Recent Advances, Daya Publishing House (2020)
2. Aziz Homayouni, Dairy Science and Food Technology: Advances and Applications, Koros Press Limited (2017)
3. S. K. De, Outlines of Dairy Technology, Oxford Publication
4. H.V. Atherton & J.A. Newlander, Chemistry and Testing of Dairy products, AVI Publishing
5. Edger Spreer, Milk and dairy Product Technology, CRC Press
6. Lawre. R. A. & Ledward, D. A. (2006). Lawres Meat Science 7th Ed. Woodhead Publishing Company, Cambridge, England.
7. Elton D Aberle, John C Forrest, David E Gerrard., Principles of meat science, Hunt Publishing Co. US, (2012)
8. Principles of Meat Science by Forest.
9. Developments in Meat Science by Lawrie.
10. Processed Meats by Pearsons.

Note for paper setters

External End Semester Examination (Total marks: 80)

Time duration: 2hrs 30 min

The question paper will have 3 sections.

Section I: Five (5) short answer questions representing all units i.e. at least one from each unit (without detailed explanation having 70-80 words) of 3 marks each = 15 marks (All compulsory)

Section II: Five (5) medium answer questions (with explanation having 250-300 words) of 7 marks each = 35 marks (All compulsory)

Section III: Five (5) long answer questions (with detailed explanation/ of 500-600 words) covering all the units. The candidate will be required to answer only two questions of 15 marks each = 30 marks.

Internal Assessment (Total Marks:20)

Time duration:1 hr

The internal assessment under CBCS shall comprise of two parts

Part A: Total weightage to this part shall be 10 marks. It will have eight short answer questions, selecting at least three from each of the two/three units/50% of the syllabus covered. A candidate has to attempt **any five** questions of two marks each

FOOD SCIENCE & QUALITY CONTROL

B. Sc.-VI- SEMESTER

Syllabi for the examinations to be held in the years May ~~2024~~, 2025, 2026 and 2027

DISCIPLINE SPECIFIC ELECTIVE (DSE)

OPTION-I

Course Code UFSTE601

TITLE: PROCESSING OF FOODS OF ANIMAL ORIGIN

Part B: Total weightage to this part shall be 10 marks. It will have two long answer questions, selecting at least one from each two / three units/50% of the syllabus covered. A candidate has to attempt **any one** question of 10 marks

FOOD SCIENCE & QUALITY CONTROL
B. Sc.-VI- SEMESTER (Under CBCS at Undergraduate Level)
DSE OPTION-I

Syllabi for the examinations to be held in the years May ²⁰²⁵~~2025~~, 2026, 2027

Title: Laboratory Course based on
PROCESSING OF FOODS OF ANIMAL ORIGIN
Credits: 2

Course Code: UFSPE602
Total Marks: 50
Internal Examination: 25 marks
End Semester Examination: 25 marks

1. Market survey of meat.
2. Preparation of meat pickle.
3. Quality evaluation of eggs
4. Evaluation of milk-total solids, fat.
5. Determination of acidity and specific gravity of milk.
6. Preparation of common milk products like Flavoured milks, Yoghurt, Butter.
7. Visit to local milk processing plant/slaughterhouse.

Scheme of Examination:

Examination (Practical)

Daily evaluation of practical records/
Viva-Voce/ attendance etc.

Syllabus to be covered in the examination % Weightage (marks)

50% (25 Marks including 5 for attendance, 5 for Viva-voce and 15 Marks (5 for Test + 10 marks daily performance))

Final Practical Performance + Viva voce 100%
(External Examination)

50% (25 Marks including 20 for external paper and 5 marks for Viva voce)

Total

50 marks

FOOD SCIENCE & QUALITY CONTROL

B. Sc.-VI- SEMESTER

Syllabi for the examinations to be held in the years May ~~2024~~, 2025, 2026 & 2027

DISCIPLINE SPECIFIC ELECTIVE (DSE)

OPTION-II

Course Code: UFSTE603

**TITLE: ADVANCES IN FOOD PROCESSING
AND FOOD ANALYSIS,**

CREDITS: THEORY-4, PRACTICAL -2

MAXIMUM MARKS: 100

EXTERNAL EXAMINATION: 80

INTERNAL ASSESSMENT: 20

THEORY (4 CREDITS): 60 HOURS

DURATION: 2hrs 30 min

Objectives/Expected Learning:

To provide knowledge about advanced methods of food processing and analysis.

Unit – 1

(12 HOURS)

- Microwave processing of foods-Principles, equipment and applications.
- Membrane processing-types and applications
- Irradiation-sources, effects on foods

Unit – 2

(12 HOURS)

- Ultrasound processing of foods.
- High Hydrostatic Pressure (HHP) processing
- Extraction Techniques- Liquid-Liquid batch extraction, Continuous extraction, Discontinuous extraction, Counter-current extraction.

Unit – 3

(12 HOURS)

- Chromatography (Paper, Thin layer & Column)-Principle, working and application.
- Atomic Absorption Spectroscopy (AAS) and its application.
- Mass Spectroscopy (MS) and its application.

Unit – 4

(12 HOURS)

- Fluorimetry- Instrument components and applications.
- Electrophoresis- Principle, Types- Continuous & Discontinuous, PAGE, AGAROSE Gel.
- X Ray Technology

FOOD SCIENCE & QUALITY CONTROL

B. Sc.-VI- SEMESTER

Syllabi for the examinations to be held in the years May ~~2024~~, 2025, 2026 & 2027

DISCIPLINE SPECIFIC ELECTIVE (DSE)

OPTION-II

Course Code: UFSTE603

TITLE: ADVANCES IN FOOD PROCESSING AND FOOD ANALYSIS

Unit – 5

(12 HOURS)

- Texture Profile Analysis (TPA) of foods.
- Scanning Electron Microscopy.
- High Power Ultra Sound.

References:

1. Handbook of Nanoencapsulation: Preparation, Characterization, Delivery and Safety of Nutraceutical Nanocomposites (2021), CRC PRESS (Taylor and Francis group)
2. Gustavo V. Barbosa-Canovas, Maria S. Tapia, and M. Pilar Cano., Novel Food Processing Technologies, CRC Press
3. G. W Gould., New Methods of Food Preservation by, 2012; Springer
4. S. Suzanne Nielsen., Food Analysis, Springer US (2010)
5. Leo M. L. Nollet and Y.H Hui., Advances in Food Diagnostics, Wiley–Blackwell
6. Semih Otles, Methods of Analysis of Food Components and Additives, 2nd Edition, CRC Press

Note for paper setters

External End Semester Examination (Total marks: 80)

Time duration: 2hrs 30 min

The question paper will have 3 sections.

Section I: Five (5) short answer questions representing all units i.e. at least one from each unit (without detailed explanation having 70-80 words) of 3 marks each = 12 HOURS (All compulsory)

Section II: Five (5) medium answer questions (with explanation having 250-300 words) of 7 marks each = 35 marks (All compulsory)

Section III: Five (5) long answer questions (with detailed explanation/ of 500-600 words) covering all the units. The candidate will be required to answer only two questions of 12 HOURS each = 30 marks.

Internal Assessment (Total Marks:20)

Time duration:1 hr

The internal assessment under CBCS shall comprise of two parts

Part A: Total weightage to this part shall be 10 marks. It will have eight short answer questions, selecting at least three from each of the two/three units/50% of the syllabus covered. A candidate has to attempt **any five** questions of two marks each.

Part B: Total weightage to this part shall be 10 marks. It will have two long answer questions, selecting at least each one from first two / three units/50% of the syllabus covered. A candidate has to attempt **any one** question of 10 marks

FOOD SCIENCE & QUALITY CONTROL:
B. Sc.- VI- SEMESTER (Under CBCS at Undergraduate Level)
DSE OPTION-II

Syllabi for the examinations to be held in the years May ~~2024, 2026, 2027~~ 2025, 2026 + 2027

Title: Laboratory Course based on
ADVANCES IN FOOD PROCESSING AND
FOOD ANALYSIS
Credits: 2

Course Code: UFSPE604
Total Marks: 50
Internal Examination: 25 marks
End Semester Examination: 25 marks

1. Visit to Food Analysis Lab to perform following practicals.

- SEM
- PAGE
- AAS
- Rheometry
- TPA
- Microwave heating of foods

Scheme of Examination:

Examination (Practical)

Daily evaluation of practical records/

Viva-Voce/ attendance etc.

Syllabus to be covered in the examination % Weightage (marks)

50% (25 Marks including 5 for attendance, 5 for Viva-voce and 15 marks (5 for Test + 10 marks daily performance))

Final Practical Performance + Viva voce 100%
(External Examination)

50% (25 Marks including 20 for external paper and 5 marks for Viva voce)

Total

50 marks



FOOD SCIENCE & QUALITY CONTROL

B. Sc.-VI- SEMESTER Skill Enhancement Course

Syllabi for the examinations to be held in the years Dec. ~~2024~~ 2025 and 2026 + 2027.

Course Code: UFSTS605

TITLE: FOOD PRODUCT DEVELOPMENT
& ENTREPRENEURSHIP

CREDITS: THEORY (4 CREDITS): 60 HOURS

DURATION: 2hrs 30 min

MAXIMUM MARKS: 100
EXTERNAL EXAMINATION: 80
INTERNAL ASSESSMENT: 20

Objectives:

1. To understand and know various aspects of food development including food science and technology.
2. To develop products which meet consumer needs and nutrition and commercially viable.

Unit-I

(12 MARKS)

New Food Products: Definition, Classification

Factors shaping new product development

Unit-II

(12 MARKS)

Reasons for new food product development, Business Idea Generation, sources of idea and evaluation, SWOT Analysis, Brief introduction of phases in food product development

Unit-III

(12 MARKS)

Recipe development, food safety and food spoilage. Stabilization of various new ingredients to suit product functions, packaging, labelling

Unit-IV

(12 MARKS)

Sensory Evaluation, shelf life testing, different preservation methods- low and high temperature, hurdle technology, packaging methods

Unit V

(12 MARKS)

Entrepreneurship: Plant location, investment, financing the project Case studies of successful entrepreneurs, Preparation of business plan, Preparation of project report

REFERENCES

1. Fuller 2004. New Food Product Development-from concept to market place. CRC.

2. Earle and Earle 2001. Creating New Foods. Chadwick House Group.

FOOD SCIENCE & QUALITY CONTROL:

B. Sc.-VI- SEMESTER

Skill Enhancement Course

Syllabi for the examinations to be held in the years Dec. ~~2024~~, 2025 and 2026 *and 2027*

Course Code: UFSTS605

**TITLE: FOOD PRODUCT DEVELOPMENT
& ENTREPRENEURSHIP**

3. Vasant Desai (2012) Fundamentals of Entrepreneurship and Small Business Management, Himalya Publishing House Pvt. Ltd., Mumbai

4. Clarke & Wright W.1999. Managing New Product and Process Development. Woodhead Publ.

Note for paper setters

External End Semester Examination (Total marks: 80)

Time duration: 2hrs 30 min

The question paper will have 3 sections.

Section I: Five (5) short answer questions representing all units i.e. at least one from each unit (without detailed explanation having 70-80 words) of 3 marks each = 15 marks (All compulsory)

Section II: Five (5) medium answer questions (with explanation having 250-300 words) of 7 marks each = 35 marks (All compulsory)

Section III: Five (5) long answer questions (with detailed explanation/ of 500-600 words) covering all the units. The candidate will be required to answer only two questions of 15 marks each = 30 marks.

Internal Assessment (Total Marks:20)

Time duration:1 hr

The internal assessment under CBCS shall comprise of two parts

Part A: Total weightage to this part shall be 10 marks. It will have eight short answer questions, selecting at least three from each of the two/three units/50% of the syllabus covered. A candidate has to attempt **any five** questions of two marks each.

Part B: Total weightage to this part shall be 10 marks. It will have two long answer questions, selecting at least each one from each of two / three units/50% of the syllabus covered. A candidate has to attempt **any one** question of 10 marks.