UNIVERSITY OF JAMMU

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

Academic Section
Email: academicsectionju14@gmail.com

NOTIFICATION
(24/July/Adp./47)

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 Studies of the subject of **Food Science and Quality Control** of Semester **Vth, VIth, VIIth and VIIIth** for **Four Year Under Graduate Programme (FYUGP)** as per **NEP-2020 (as given in the annexure)** for the examinations to be held in the years as per the details given below:

Subject	**Semester**	**For the examinations to be held in the year**
Food Science and Quality Control	Semester- V	Dec. 2024, 2025 and 2026
	Semester-VI	May 2025, 2026 and 2027
	Semester-VII	Dec. 2025, 2026 and 2027
	Semester- VIII	May 2026, 2027 and 2028

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

Sd/-
DEAN ACADEMIC AFFAIRS

No. F. Acd/II/24/3141-60
Dated: 22/7/24

Copy for information and necessary action to:

1. Dean, Faculty of Science
2. HOD/Convener, Board of Studies in **Home Science/Food Science and Quality Control**
3. Sr. P.A.to the Controller of Examinations
4. All members of the Board of Studies
5. Confidential Assistant to the Controller of Examinations
6. I/C Director, Computer Centre, University of Jammu
7. Deputy Registrar/Asst. Registrar (Conf. /Exams. UG)
8. Incharge, University Website for Uploading of the notification

Sumita Sharma 22/7

Deputy Registrar (Academic)

22/7/24

University of Jammu

Syllabi

Four Year Under Graduate Programme (FYUGP) as per NEP – 2020

in

Food Science and Quality Control

(Semester V-VIII)

Four Year Under Graduate Programme (FYUGP) as per NEP – 2020

Food Science and Quality Control

Semester - V

(Examination to be held in December 2024, 2025 and 2026)

S.No	Course Type	Course No.	Course Title	Credits (Theory + Practical)	Marks				Total Marks
					Theory		Practical/Tutorials		
1	Major	UMJFST-501	Technology of Spices, Condiments and Plantation Crops	(3 + 1)	Mid Semester 15 Marks	End Exam 60 Marks	Assessment 10 Marks	Exam 15 Marks	75 + 25 = **100**
2	Major	UMJFST-502	Food Toxicology	(3 + 1)	Mid Semester 15 Marks	End Exam 60 Marks	Assessment 10 Marks	Exam 15 Marks	75 + 25 = **100**
3	Major	UMJFST-503	Nutraceutical and Functional Foods	(3 + 1)	Mid Semester 15 Marks	End Exam 60 Marks	Assessment 10 Marks	Exam 15 Marks	75 + 25 = **100**
4	Major	UMJFST-504	Unit Operation in Food Industry	2	Mid Semester 10 Marks	End Exam 40 Marks	--	--	**50**
5	Minor	UMIFST-505	Technology of Spices, Condiments and Plantation Crops	(3 + 1)	Mid Semester 15 Marks	End Exam 60 Marks	Assessment 10 Marks	Exam 15 Marks	75 + 25 = **100**
6	Skill Enhancement Course	USEGEI-506	Summer Internship	2	--	--	25 Marks	25 Marks	25+25 =**50**

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester V
(Examination to be held in December 2024, 2025, 2026)
Major Course (Theory)

Course Code: UMJFST-501

Course Title: Technology of Spices, Condiments and Plantation Crops

Credits: 03

Total No. of Lectures: 45

Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Course learning outcomes:

1. Identify various spices, condiments and plantation crops.
2. Learn post-harvest technologies and processing of spices, condiments and plantation crops.
3. Illustrate various value-added products of spices, condiments and plantation crops.
4. Perceive Standards, specifications, packaging and Quality control measures of spices, condiments and plantation crops.
5. Gain an in-depth knowledge on spices, condiments and plantation crops.
6. Apply post-harvest and processing technologies to improve the quality and safety of spices, condiments and plantation crops.
7. Recommend Standards, specifications, packaging and Quality control measures of spices, condiments and plantation crops.
8. Able to prepare various value-added products of spices, condiments and plantation crops.

UNIT-I: Introduction

- History, definition and composition of spices and condiments.
- Commercial value of Spices, Condiments, plantation crops and their products in global market.
- Classification of Spices and condiments-based on parts used, aromatic origin, family and mixed: major and minor spices
- Quality control measures of spices, condiments and plantation crops.

UNIT-II: Spices and condiments

- Processing of Major - Pepper, Cardamom, Ginger, Red Chilli, Turmeric
- Processing of Minor Spices- Cumin, Coriander, Fenugreek, Garlic.
- Value added products of spices and condiments.

UNIT-III: Plantation crops-A

- Coffee: Bean processing - Grading, blending, roasting of seeds, grinding, brewing; Coffee varieties & processing - Decaffeinated Coffee, Instant Coffee, extraction, Dehydration, Aromatization; Plant and machinery for coffee processing.

Food Science and Quality Control
Semester V
(Examination to be held in December 2024, 2025, 2026)
Major Course (Theory)

Course Code: UMJFST-501

Course Title: Technology of Spices, Condiments and Plantation Crops

Credits: 03
Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Total No. of Lectures: 45

- Tea: Tea processing- leaves gathering, Grading, leaf processing; Types of tea & processing - dust tea, black tea, green tea, Oolong tea, Instant tea.

UNIT-IV: Plantation crops - B

- Cocoa - Production, Composition, Grading, Processing, Cocoa Products (cocoa mass, cocoa powder, cocoa butter, cocoa-based beverages, malted beverages, cocoa liquor)
- Coconut - Production, Composition, Grading, Post-Harvest Technology, Processing and Products (coconut milk, desiccated coconut).

REFERENCES

1. Prema Singh Arya, (2000), Spice crops of India, Kalyani Publishers, New Delhi (India).

2. Singh, V.B. and Kirti Singh, (2000), Spices, New Age International Publisher, New Delhi.

3. Parthasarthy, V.A., Chattopadhyaya, P.K., Bose, T.K. 2006, Plantation crops. Vol 1&2, NayaUdyog, Kolkata, India.

4. Vijayakhader. (2001)."Text Book of Food science and Technology" ICAR, New Delhi.

5. NIIR board of consultants and engineers. The complete book on spices and condiments, Asia pacific business press, New Delhi.

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester V
(Examination to be held in December 2024, 2025, 2026)
Major Course (Practical)

Course Code: UMJFST-501 **Course Title:** Technology of Spices, Condiments and Plantation Crops

Credits: 01
Maximum Marks: 25

List of Practical

- Grading of Spices
- Detection of Adulteration in spices (Black Pepper / Red Chili Powder / Turmeric – Any one spice)
- Determination of volatile oil in Spices
- To find out the Moisture content of tea (CTC/Orthodox)
- To find out TSS of Black Tea.
- Sensory Evaluation of different tea sold in local Market
- Preparation of Coconut Milk
- Preparation of desiccated coconut

Scheme of Examination:

THEORY		
DESCRIPTION	**TIME ALLOTTED**	**MARKS**
Mid Semester Assessment Test shall be conducted by the course coordinator after completion of the syllabus up to 50% and the pattern of the examination shall be decided by the respective Board of Studies	1½ Hours	15
End Semester University Examination shall be conducted for entire syllabus. The break up is as under: **Section A** shall consist Four (4) short answer questions having one question from each unit. The students are required to attempt all questions. Each question shall be of 3 Marks. **Section B** shall consist Eight (8) long answer questions having two questions from each unit. The students are required to attempt one question from each unit. Each question shall be of 12 Marks.	3 Hours	60
PRACTICAL/TUTORIAL		
Daily evaluation of practical's/tutorials/Viva voce/Records etc.	10 Marks for Continuous Assessment	
Final Examination **Note: The BOS shall device the mechanism of Final examination.**	15 Marks for Final examination	

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester V
(Examination to be held in December 2024, 2025, 2026)
Major Course (Theory)

Course Code: UMJFST-502
Credits: 03
Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Course Title: Food Toxicology
Total No. of Lectures: 45

Course learning outcomes:

1. Know the various toxins and their evaluation
2. Genetically engineered food, pests and their safety.
3. Understand their tolerance and control measures.
4. Importance of Toxicology. Physical treatment of food and health hazards
5. Substances intentionally added to foods. Choice of technology, plant and equipment. Creativity and innovation
6. Examination and prevent occurrence of toxins in foods

UNIT – I

- Introduction to food toxicology: classification, dose, determination toxins in food
- Naturally occurring toxins from animals, bacterial and fungal and sea food sources.
- Importance of Toxicology.
- Carcinogens

UNIT – II

- Food additives as toxicants: artificial colors, sweeteners,
- Toxicants formed during food processing such as nitrosomines, Maillard reaction products acrylamide, benzene, heterocyclic amines and aromatic hydrocarbons and irradiation
- Risk of genetically modified food, food supplements, persistent organic pollutants.
- Genetically engineered food, pests and their safety.

UNIT – III

- Microbial and Parasitic poisoning:
  - i. Food poisoning and food infections or food borne illness.
  - ii. Mycotoxins- aflatoxin
  - iii. Bacterial toxin
- Hormones in food.

UNIT – IV

- Chemical preservatives used in Food.
- Pesticides, Heavy metals (Lead, Arsenic and Mercury), Hormones in food.

Food Science and Quality Control
Semester V
(Examination to be held in December 2024, 2025, 2026)
Major Course (Theory)

Course Code: UMJFST-502
Credits: 03
Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Course Title: Food Toxicology
Total No. of Lectures: 45

- Pesticide Residues in Food
- Food Additives -substances intentionally added to foods; Preservatives, Antioxidants, Color, Stabilizers

REFERENCES

1. Food Toxicology, Debasis Bagchi, Anand Swaroop, 1st Edition, CRC Press, (2016).
2. Introduction to Food Toxicology, Takayuki Shibamoto, Leon ard F. Bjeldanes, (2009).
3. Food Toxicology, Ed. William Helferich and Carl K. Winter, Boca Raton: CRC Press, (2001).
4. A Textbook of Modern Toxicology, Ed. ERNEST HODGSON, PhD, Wiley-Inter science, (2010)
5. Molecular and Biochemical Toxicology, Ed. Robert C. Smart, Ernest Hodgson, Wiley, (2008).

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester V
(Examination to be held in December 2024, 2025, 2026)
Major Course (Practical)

Course Code: UMJFST-502 **Course Title:** Food Toxicology
Credits: 01
Maximum Marks: 25

List of Practical

- Paper Chromatic Techniques
- Demonstration of GLC/HPLC
- ANALYTICAL SYSTEMATIC IN FOOD TOXICOLOGY. Types and sample preparation in the analysis of toxic substances in food.
- Use of various Techniques in the analysis of toxics present in foods: basis and applications (Demonstration).
- ANALYSIS OF FOOD CONTAMINANTS: Preparation of a sample, extraction, analysis calculations. Interpretation of results

Note: Since methods being used in analysis of Toxins in food involve use of Advanced Equipment so wherever possible, demonstration may be preferred.

Scheme of Examination:

THEORY		
DESCRIPTION	**TIME ALLOTTED**	**MARKS**
Mid Semester Assessment Test shall be conducted by the course coordinator after completion of the syllabus up to 50% and the pattern of the examination shall be decided by the respective Board of Studies	1½ Hours	15
End Semester University Examination shall be conducted for entire syllabus. The break up is as under: **Section A** shall consist Four (4) short answer questions having one question from each unit. The students are required to attempt all questions. Each question shall be of 3 Marks. **Section B** shall consist Eight (8) long answer questions having two questions from each unit. The students are required to attempt one question from each unit. Each question shall be of 12 Marks.	3 Hours	60
PRACTICAL/TUTORIAL		
Daily evaluation of practical's/tutorials/Viva voce/Records etc.	10 Marks for Continuous Assessment	
Final Examination **Note: The BOS shall device the mechanism of Final examination.**	15 Marks for Final Examination	

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester V
(Examination to be held in December 2024, 2025, 2026)
Major Course (Theory)

Course Code: UMJFST-503

Course Title: Nutraceuticals and Functional Foods

Credits: 03
Total No. of Lectures: 45
Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Course learning outcomes:

1. Develop trained manpower in the field of nutraceutical Sciences with specific emphasis for exploitation of traditional system of medicine as well as the need for changing trends in the nutraceutical Industry.
2. Training in the formulation, processing, manufacture and packaging requirements of nutraceuticals.
3. Impart knowledge of specialty nutraceuticals their design requirements.
4. Exposure to National & International regulatory affairs with reference to nutraceuticals

UNIT – I

- *Introduction to Nutraceuticals as Science:* Definition, Historical perspective, classification, scope & future prospects.
- Applied aspects of the Nutraceutical Science.
- Sources of Nutraceuticals.
- Relation of Nutraceutical Science with Food Technology

UNIT – II

- Antioxidants: Concept of free radicals and antioxidants; antioxidants role as nutraceuticals and functional foods.
- Food as Remedies: Nutraceuticals for specific situations such as cancer, heart disease, diabetes, stress, osteoarthritis, hypertension; nutraceutical remedies for common disorders like arthritis, bronchitis, circulatory problems, hypoglycemia, liver disorders, osteoporosis, psoriasis and ulcers, etc.

UNIT – III

- Different foods as functional food:
  - cereal products (oats, wheat bran, rice bran)
  - Fruits and vegetables
  - Milk and milk products
  - Legumes, nuts, oil seeds and sea foods

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester V
(Examination to be held in December 2024, 2025, 2026)
Major Course (Theory)

Course Code: UMJFST-503 **Course Title:** Nutraceuticals and Functional Foods

Credits: 03 **Total No. of Lectures:** 45
Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

- Herbs, spices and medicinal plants.
- Coffee, tea and other beverages as functional foods/drinks and their protective effects.
- Brief idea about some Nutraceutical rich supplements e.g. Bee pollen, Lecithin, Mushroom extract, Chlorophyll, Kelp and Spirulina

UNIT – IV

- Anti-nutritional Factors present in Foods: Types of inhibitors present in various foods and their inactivation.
- General idea about role of Probiotics and Prebiotics as nutraceuticals.
- Toxics originated during food processing and storage, Adulterants, Substances generated during cooking. Transfer of substances from packaging. Substances added illegally to food.

REFERENCES:

- Giuseppe Mazza; Functional Foods: Biochemical and Processing Aspects, Volume 1; CRC Press
- Robert E.C. Wildman; Handbook of Nutraceuticals and Functional Foods, Second Edition; CRC Press
- Massimo Maffei; Dietary Supplements of Plant Origin; CRC Press
- Fereidoon Sahidi, Deepthi K. Weerasinghe; Nutraceutical Beverages, Chemistry, Nutrition and Health Effects; American Chemical Society
- Ronald R. Watson; Vegetables, Fruits, and Herbs in Health Promotion; CRC Press
- Fruit and Cereal Bioactives: Sources, Chemistry and Applications; ÖzlemTokusoglu; Clifford Hall III; CRC Press
- Susan Sungsoo Cho, Mark L. Dreher; Marcel; Dekker Handbook of Dietary Fibre

Food Science and Quality Control
Semester V
(Examination to be held in December 2024, 2025, 2026)
Major Course (Practical)

Course Code: UMJFST-503 **Course Title:** Nutraceutical and Functional Foods
Credits: 01
Maximum Marks: 25

List of Practical

- Preparation of Probiotic Food
  - Yoghurt
  - Curd
  - Pickles (Sauerkraut / Gherkins)
- Preparation of Fermented Products
- Detection of Adulterants

Scheme of Examination:

THEORY		
DESCRIPTION	**TIME ALLOTTED**	**MARKS**
Mid Semester Assessment Test shall be conducted by the course coordinator after completion of the syllabus up to 50% and the pattern of the examination shall be decided by the respective Board of Studies	1½ Hours	15
End Semester University Examination shall be conducted for entire syllabus. The break up is as under: **Section A** shall consist Four (4) short answer questions having one question from each unit. The students are required to attempt all questions. Each question shall be of 3 Marks. **Section B** shall consist Eight (8) long answer questions having two questions from each unit. The students are required to attempt one question from each unit. Each question shall be of 12 Marks.	3 Hours	60
PRACTICAL/TUTORIAL		
Daily evaluation of practical's/tutorials/Viva voce/Records etc.	10 Marks for Continuous Assessment	
Final Examination **Note: The BOS shall device the mechanism of Final examination.**	15 Marks for Final Examination	

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester V
(Examination to be held in December 2024, 2025, 2026)
Major Course (Theory)

Course Code: UMJFST-504 **Course Title:** Unit Operations in Food Industry
Credits: 02 **Total No. of Lectures:** 30
Maximum Marks: 50

Course learning outcomes:

To enable the students to:
1. Understand the principle of Unit operation in food industry.
2. Learn important preliminary operations in food processing industries.
3. Impart knowledge on Safety, sanitation and Effluent Treatment in food industry.
4. Know the different pre and post processing operations as storage and packaging foods etc.

Unit -I
Introduction to unit operations in food processing.
Units and Dimensions; Basic principles, Total mass balance and energy balance.
Size reduction processes Size reduction: Principles, Theory, size reduction methods- compression, impact, shearing and cutting, standard sieves

Unit-II: Mechanical Operations
Oil expression and extractions-hydraulic press, screw press.
Separation processes Definition and introduction to separation; types of separators –disk, indented cylinder, spiral, specific gravity, destoners, inclined draper, pneumatic and aspirator, Mechanical separation, sedimentation, principle, equipment and applications.

Unit-III:
Centrifugation: principle, centrifugation equipment and applications in food industries.
Filtration: Theory, equipment, types of filters, applications.
Evaporation: Basic principle, need for evaporation, boiling point elevation, heat transfer during evaporation,
Distillation: Theory and principles, liquid vapor equilibrium, distillation of binary mixtures, simple distillation, steam distillation, vacuum distillation, and fractional distillation.

REFFERENCES:

1. D. G. Rao, Fundamentals of food engineering, Prentice-Hall of India, New Delhi, 2010

2. R. Paul Singh and Dennis R. Heldman, Introduction to Food Engineering, 4th Edition, Academic Press, 2009.

3. Z. Berk, Food Process Engineering and Technology, Food Science and Technology, 1st Edition, International Series, Elsevier, 2009.

Food Science and Quality Control
Semester V
(Examination to be held in December 2024, 2025, 2026)
Major Course (Theory)

Course Code: UMJFST-504
Credits: 02
Maximum Marks: 50

Course Title: Unit Operations in Food Industry
Total No. of Lectures: 30

4. J.M. Smith, H.C. Van Ness and M.M. Abbott. 2005. Introduction to Chemical Engineering Thermodynamics, 7th Ed. McGraw-Hill, Inc., NY, USA.

Scheme of Examination:

THEORY		
DESCRIPTION	**TIME ALLOTTED**	**MARKS**
Mid Semester Assessment Test shall be conducted by the course coordinator after completion of the syllabus up to 50% and the pattern of the examination shall be decided by the respective Board of Studies	1½ Hours	10
End Semester University Examination shall be conducted for entire syllabus. The break up is as under: **Section A** shall consist Four (4) short answer questions covering all the units. The students are required to attempt all questions. Each question shall be of 2½ Marks. **Section B** shall consist Six (6) long answer questions having two questions from each unit. The students are required to attempt one question from each unit. Each question shall be of 10 Marks.	2½ Hours	40

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester V
(Examination to be held in December 2024, 2025, 2026)
Minor Course (Theory)

Course Code: UMIFST-505

Course Title: Technology of Spices, Condiments and Plantation Crops

Credits: 03

Total No. of Lectures: 45

Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Course learning outcomes:

1. Identify various spices, condiments and plantation crops.
2. Learn post-harvest technologies and processing of spices, condiments and plantation crops.
3. Illustrate various value-added products of spices, condiments and plantation crops.
4. Perceive Standards, specifications, packaging and Quality control measures of spices, condiments and plantation crops.
5. Gain an in-depth knowledge on spices, condiments and plantation crops.
6. Apply post-harvest and processing technologies to improve the quality and safety of spices, condiments and plantation crops.
7. Recommend Standards, specifications, packaging and Quality control measures of spices, condiments and plantation crops.
8. Able to prepare various value-added products of spices, condiments and plantation crops.

UNIT-I

- History, definition and composition of spices and condiments.
- Commercial value of Spices, Condiments, plantation crops and their products in global market.
- Classification of Spices and condiments-based on parts used, aromatic origin, family and mixed: major and minor spices

UNIT-II: Spices and condiments

- Processing of Major - Pepper, Cardamom, Ginger, Red Chilli, Turmeric
- Processing of Minor Spices- Cumin, Coriander, Fenugreek, Garlic.

UNIT-III: Plantation crops-A

- Coffee: Bean processing - Grading, blending, roasting of seeds, grinding, brewing; Coffee varieties & processing - Decaffeinated Coffee, Instant Coffee, extraction, Dehydration, Aromatization;
- Tea: Tea processing- leaves gathering, Grading, leaf processing; Types of tea & processing - dust tea, black tea, green tea, Oolong tea, Instant tea.

Food Science and Quality Control
Semester V
(Examination to be held in December 2024, 2025, 2026)
Minor Course (Theory)

Course Code: UMIFST-505

Course Title: Technology of Spices, Condiments and Plantation Crops

Credits: 03
Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Total No. of Lectures: 45

UNIT-IV: Plantation crops - B

- Cocoa - Production, Composition, Grading, Processing, Cocoa Products (cocoa mass, cocoa powder, cocoa butter, cocoa-based beverages, malted beverages, cocoa liquor)
- Coconut - Production, Composition, Grading, Post-Harvest Technology, Processing and Products (coconut milk, desiccated coconut).

REFERENCES

1. Bose, T.K., Mitra, S.K., Farooqui, A.A. and Sadhu, M.K. (1999), Tropical Horticulture-Vol-1, Nayaprakash, Calcutta.

2. Prema Singh Arya, (2000), Spice crops of India, Kalyani Publishers, New Delhi (India).

3. Kumar, N., Abdul Khader, Rangaswami, P. and Irvadappan, (1993), Introduction to spices, plantation crops, Medicinal and Aromatic plants, Rajalakshmi Publication.

4. Singh, V.B. and Kirti Singh, (2000), Spices, New Age International Publisher, New Delhi.

5. Parthasarthy, V.A., Chattopadhyaya, P.K., Bose, T.K. (2006), Plantation crops. Vol 1&2, NayaUdyog, Kolkata, India.

6. Vijayakhader. (2001)."Text Book of Food science and Technology" ICAR, New Delhi.

7. NIIR board of consultants and engineers. The complete book on spices and condiments, Asia pacific business press, New Delhi.

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester V
(Examination to be held in December 2024, 2025, 2026)
Minor Course (Practical)

Course Code: UMIFST-505 **Course Title:** Technology of Spices, Condiments and Plantation Crops

Credits: 01
Maximum Marks: 25

List of Practical

- Grading of Spices
- Detection of Adulteration in spices (Black Pepper / Red Chili Powder / Turmeric – Any one spice)
- Determination of volatile oil in Spices
- To find out the Moisture content of tea (CTC/Orthodox)
- To find out TSS of Black Tea.
- Sensory Evaluation of different tea sold in local Market
- Preparation of Coconut Milk
- Preparation of desiccated coconut

Scheme of Examination:

THEORY		
DESCRIPTION	**TIME ALLOTTED**	**MARKS**
Mid Semester Assessment Test shall be conducted by the course coordinator after completion of the syllabus up to 50% and the pattern of the examination shall be decided by the respective Board of Studies	1½ Hours	15
End Semester University Examination shall be conducted for entire syllabus. The break up is as under: **Section A** shall consist Four (4) short answer questions having one question from each unit. The students are required to attempt all questions. Each question shall be of 3 Marks. **Section B** shall consist Eight (8) long answer questions having two questions from each unit. The students are required to attempt one question from each unit. Each question shall be of 12 Marks.	3 Hours	60
PRACTICAL/TUTORIAL		
Daily evaluation of practical's/tutorials/Viva voce/Records etc.	10 Marks for Continuous Assessment	
Final Examination **Note: The BOS shall device the mechanism of Final examination.**	15 Marks for Final examination	

Food Science and Quality Control
Semester V
(Examination to be held in December 2024, 2025, 2026)
Skill Enhancement Course

Course Code: USEGEI-506
Credits: 02

Course Title: Summer Internship
Maximum Marks: 50

Course learning outcomes:

1. To provide hands-on experience in various sectors of the food industry
2. To develop skills in food production, safety, and quality control
3. To understand the principles of food science and technology
4. To enhance knowledge of supply chain management and sustainability in the food industry
5. To foster innovation and creativity in food product development

Summer Internship Programme

- Summer Internship Program designed for students to enhance their skills in the food industry. This intensive program combines theoretical knowledge with practical experience, providing participants with a comprehensive understanding of the industry's dynamics, processes, and innovation trends.
- Each student will attend 2 months hands on training at any food manufacturing Plant. He/She should focus on the following areas:

A. Food Production and Processing
B. Safety and Sanitation
C. Quality Control and Food Safety
D. Product Development and Innovation
E. Supply Chain Management
F. Understanding of Industry Standards and Regulations

Outcomes:

By the end of the internship, participants will have a comprehensive understanding of the food industry, equipped with practical experience, enhanced skills, and professional connections, positioning them for successful careers in the field. The major outcomes are as follows:

1. Practical Experience in Food Production

2. Enhanced knowledge of food safety and quality control.

3. Exposure to product development and innovation

Food Science and Quality Control
Semester V
(Examination to be held in December 2024, 2025, 2026)
Skill Enhancement Course

Course Code: USEFSI-506 **Course Title:** Summer Internship
Credits: 02 **Maximum Marks: 50**

4. Knowledge of supply chain management
5. Professional Growth and networking
6. Technical and Soft skills developments
7. Understanding of Industry standards and regulations
8. Certification and Career advancement
9. Real world problem solving
10. Increased confidence and professionalism

Four Year Under Graduate Programme (FYUGP) as per NEP – 2020

Food Science and Quality Control

Semester - VI

(Examination to be held in May 2025, 2026 and 2027)

S. No.	Course Type	Course No.	Course Title	Credits (Theory + Practical)	Marks				Total Marks
					Theory		Practical/Tutorials		
1	Major	UMJFST601	Food Product Development	(3 + 1)	Mid Semester 15 Marks	End Exam 60 Marks	Assessment 10 Marks	Exam 15 Marks	75 + 25 = **100**
2	Major	UMJFST602	Food Engineering	(3 + 1)	Mid Semester 15 Marks	End Exam 60 Marks	Assessment 10 Marks	Exam 15 Marks	75 + 25 = **100**
3	Major	UMJFST603	Advance Statistics in Food Science & Quality Control	(3 + 1)	Mid Semester 15 Marks	End Exam 60 Marks	Assessment 10 Marks	Exam 15 Marks	75 + 25 = **100**
4	Major	UMJFST604	Food Industry Management	(3 + 1)	Mid Semester 15 Marks	End Exam 60 Marks	Assessment 10 Marks	Exam 15 Marks	75 + 25 = **100**
5	Minor	UMIFST605	Food Product Development	(3 + 1)	Mid Semester 15 Marks	End Exam 60 Marks	Assessment 10 Marks	Exam 15 Marks	75 + 25 = **100**

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VI
(Examination to be held in May 2025, 2026, 2027)
Major Course (Theory)

Course Code: UMJFST-601
Credits: 03
Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Course Title: Food Product Development
Total No. of Lectures: 45

Course learning outcomes:

1. Understand the process of development of food product.
2. Understand the role of research and development in food product development and food manufacture.
3. Apply the knowledge gained in various situations.
4. Development new food product which are nutritious, cost effective and marketable

Unit -I

- Basics of Food Product Development: Definition, Classification of new food product, Reason for new food, Product development– social concerns, Health concerns.
- Product development- Market place influences, Technological influences, Governmental influences, Product life cycle, New Product Development team, concept of market and marketing

Unit -II

- Idea Generation, Idea Screening, Concept testing, Business analysis, Product development, Test marketing, Commercialization., Market and literature survey to identify the concepts of new products, Development of prototype product and standardization of formulation process, proximate analysis, shelf-life study of new product, Cost analysis and final project report
- Designing new products using need-based perspective and application in various situations the R and D process. Developing standards products- Types of product and logistics, primary and secondary, various food ingredients used, use of additives.

Unit -III

- Standardization and large-scale preparation. Chemical and physical properties of foods- shelf-life studies shelf predictions.
- Storage and transportation – Types and mode of transportation optimization of Transport taking into account the types of product distance storage facilities, Equipment and space

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VI
(Examination to be held in May 2025, 2026, 2027)
Major Course (Theory)

Course Code: UMJFST-601
Credits: 03
Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Course Title: Food Product Development
Total No. of Lectures: 45

Unit -IV

- Sensory Evaluation of Foods: Definition and concept.
- Threshold Tests for Basic Taste
- Selection of sensory panel
- Different types of sensory tests:
  - Paired Comparison Test.
  - Rank Test
  - Score Test
  - Hedonic Scale

References:

1. Food Product Development, M Earle, R Earle, A Anderson, Woodhead Publishing, (2001).
2. New Food Product Development: from Concept to Marketplace, Gordon W Fuller, CRC Press, 3rd edition, (2011).
3. Methods for Developing the New Food Products, Fadi Aramouni, Kathryn Deschenes, Desteh Publications, 2nd edition, (2017).
4. Strategies for Formulations Development: A step-by-step Guide using JMP, Ronald D. Snee, Roger W. Hoeri, SAS Institute; revised edition, (2016).
5. An Integrated Approach to New Food Product Development, Howard R. Moskowitz, I. Sam Saguy, Tim Straus, CRC Press, (2009).

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VI
(Examination to be held in May 2025, 2026, 2027)
Major Course (Practical)

Course Code: UMJFST-601
Credits: 01
Maximum Marks: 25

Course Title: Food Product Development

List of Practical:

1. To conduct the market research for various new products available.
2. Development of a new product
3. Determination of the taste threshold for the different sensations – sweet, salty, sour, Bitter
4. To Conduct a descriptive analysis of a given sample of Food (Bread/Biscuit etc.) on the basis of its sensory attributes
5. To perform Hedonic Scale Test / Rank Test /Score Methods

Scheme of Examination:

THEORY		
DESCRIPTION	**TIME ALLOTTED**	**MARKS**
Mid Semester Assessment Test shall be conducted by the course coordinator after completion of the syllabus up to 50% and the pattern of the examination shall be decided by the respective Board of Studies	1½ Hours	15
End Semester University Examination shall be conducted for entire syllabus. The break up is as under: **Section A** shall consist Four (4) short answer questions having one question from each unit. The students are required to attempt all questions. Each question shall be of 3 Marks. **Section B** shall consist Eight (8) long answer questions having two questions from each unit. The students are required to attempt one question from each unit. Each question shall be of 12 Marks.	3 Hours	60
PRACTICAL/TUTORIAL		
Daily evaluation of practical's/tutorials/Viva voce/Records etc.	10 Marks for Continuous Assessment	
Final Examination **Note: The BOS shall device the mechanism of Final examination.**	15 Marks for Final examination	

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VI
(Examination to be held in May 2025, 2026, 2027)
Major Course (Theory)

Course Code: UMJFST-602
Credits: 03
Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Course Title: Food Engineering
Total No. of Lectures: 45

Course learning outcomes:

1. Understand the basic Principles of food engineering.
2. Describe the types and properties of Refrigeration systems
3. An insight of processing equipment like pasteurizer, spray drier and sealing equipment.
4. Enumerate processing equipment and maintenance of processing equipment.

Unit-I

- *Basic Principles of Food Engineering:* Engineering properties of food materials: physical, thermal, aerodynamic, mechanical, optical and electromagnetic properties.
- *Units, Dimensions and Conversions*: Unit Operations, elements of measuring instruments- machine elements and electrical elements.

Unit-II

- Principles of mass and energy balance in food processing operations; Thermodynamics concepts applied to food
- Momentum transport with respect to foods, Fluid dynamics, Newtonian and non-Newtonian fluid, Bernoulli's Theorem and friction factor; velocity profile in different case studies like pipe, conduits, Flow measuring instruments.

Unit-III

- Refrigeration and Freezing in Food Industry
- Parts and Functions of a Refrigerator. Refrigeration Cycle. Types of Refrigerants.
- Concept of Refrigerator Load (one ton, etc.).
- Cryogenic Freezing and Individual Quick Freezing (IQF)
- Concept of cold storage design

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VI
(Examination to be held in May 2025, 2026, 2027)
Major Course (Theory)

Course Code: UMJFST-602
Credits: 03
Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Course Title: Food Engineering
Total No. of Lectures: 45

Unit-IV:

- Mechanical operations in food: Size reduction; homogenization; centrifugation; settling and clarification
- Factors to be considered for location and layout of food plants. Regulatory requirements of food industries.

REFERENCES

1. Berk, Z. (2018). Food process engineering and technology. Academic press.
2. Das, H. (2005). Food Processing Operations Analysis. Asian Books.
3. Rao, G.C. (2006).Essentials of Food Process Engineering.BS Publications.
4. Rao, M.A, S.S.H. Rizvi and A.K. Datta. (2005). Engineering Properties of Food, 3rd edn. Taylor and Francis

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VI
(Examination to be held in May 2025, 2026, 2027)
Major Course (Practical)

Course Code: UMJFST-602 **Course Title:** Food Engineering
Credits: 01
Maximum Marks: 25

List of Practical:

1. Determination of particle size of granular foods by sieve analysis.
2. Analysis of flow rate through flow through pipes.
3. Freezing of vegetable
4. Drying of vegetables
5. Visit to food processing industries

Scheme of Examination:

THEORY		
DESCRIPTION	**TIME ALLOTTED**	**MARKS**
Mid Semester Assessment Test shall be conducted by the course coordinator after completion of the syllabus up to 50% and the pattern of the examination shall be decided by the respective Board of Studies	1½ Hours	15
End Semester University Examination shall be conducted for entire syllabus. The break up is as under: **Section A** shall consist Four (4) short answer questions having one question from each unit. The students are required to attempt all questions. Each question shall be of 3 Marks. **Section B** shall consist Eight (8) long answer questions having two questions from each unit. The students are required to attempt one question from each unit. Each question shall be of 12 Marks.	3 Hours	60
PRACTICAL/TUTORIAL		
Daily evaluation of practical's/tutorials/Viva voce/Records etc.	10 Marks for Continuous Assessment	
Final Examination **Note: The BOS shall device the mechanism of Final examination.**	15 Marks for Final examination	

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VI
(Examination to be held in May 2025, 2026, 2027)
Major Course (Theory)

Course Code: UMJFST-603

Course Title: Advance Statistics in Food Science &Quality Control

Credits: 03
Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Total No. of Lectures: 45

Course learning outcomes:

1. Get awareness about the scope of statistics in research.
2. Understand the concepts of inferential statistics like t-test, chi-square, Correlation and Variance.
3. Critically apply knowledge of application of statistics in data analysis.
4. Enable in students the skills in selecting, computing, interpreting and reporting descriptive statistics.
5. Facilitate comprehension of elementary concepts in probability.

Unit-I

- *Statistics:* Meaning, Definition and Scope, limitations - Role of statistics in Research.
- Sampling techniques – Simple and Stratified Random Sampling techniques.
- Descriptive Statistics: Classification and tabulation of data, Graphic and diagrammatic presentation of data,

Unit – II

- Frequencies and Percentages
- Computing and average/ Measurement of central tendency (Mean, Media and Mode), Standard Deviation
- Variation and Dispersion, Normal distribution, Frequency distribution, histogram, frequency polygons, curve ogive
- Levels of Significance

Unit- III

- *Probability:* Definition, Role of probability in research and statistics, Elementary concepts in probability
- Sample space, experiment, event/outcome/element of the sample space
- Equally likely outcomes and the uniform probability model
- Stabilization of the relative frequency

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VI
(Examination to be held in May 2025, 2026, 2027)
Major Course (Theory)

Course Code: UMJFST-603

Course Title: Advance Statistics in Food Science &Quality Control

Credits: 03
Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Total No. of Lectures: 45

Unit – IV

Inferential statistics

- 't test for large samples (mean and proportions) and small samples
- Chi square test for significance and association
- Analysis of variance-one way, two way
- Correlation, coefficient of correlation, rank correlation

References:

1. Jackson, S. L. (2012). *Research methods and statistics: A critical thinking approach* (4th ed.). Wadsworth Cengage Learning.
2. Johnson, R. A., and Bhattacharyya, G. K. (2019). *Statistics: Principles and methods* (8th ed.). John Wiley.
3. Martin, W. E., and Bridgmon, K. D. (2012). *Quantitative and statistical research methods*. Jossey-Bass.
4. Kerlinger, F. N. and Lee, H. B. (2000). *Foundations of behavioral research*. Harcourt
5. Wheelan, C. J. (2014). *Naked statistics: Stripping the dread from the data*. W.W. Norton

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VI
(Examination to be held in May 2025, 2026, 2027)
Major Course (Practical)

Course Code: UMJFST-603

Course Title: Advance Statistics in Food Science &Quality Control

Credits: 01
Maximum Marks: 25

- The students will collect the data, apply the relevant statistical method to calculate the results and draw the inference from the results obtained.
- Students can work in pairs/groups
- Students can collect relevant data from the market samples and apply different statistical methods.

List of Practical:

1. Calculate Mean Mode and Median
2. Calculate Standard Deviation
3. Draw Histograms and Normal Distribution Curve.
4. Draw Bar, Line and Pie Charts
5. ANOVA

Scheme of Examination:

THEORY		
DESCRIPTION	**TIME ALLOTTED**	**MARKS**
Mid Semester Assessment Test shall be conducted by the course coordinator after completion of the syllabus up to 50% and the pattern of the examination shall be decided by the respective Board of Studies	1½ Hours	15
End Semester University Examination shall be conducted for entire syllabus. The break up is as under: **Section A** shall consist Four (4) short answer questions having one question from each unit. The students are required to attempt all questions. Each question shall be of 3 Marks. **Section B** shall consist Eight (8) long answer questions having two questions from each unit. The students are required to attempt one question from each unit. Each question shall be of 12 Marks.	3Hours	60
PRACTICAL/TUTORIAL		
Daily evaluation of practical's/tutorials/Viva voce/Records etc.	10 Marks for Continuous Assessment	
Final Examination **Note: The BOS shall device the mechanism of Final examination.**	15 Marks for Final examination	

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VI
(Examination to be held in May 2025, 2026, 2027)
Major Course (Theory)

Course Code: UMJFST-604
Credits: 03
Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Course Title: Food Industry Management
Total No. of Lectures: 45

Course learning outcomes:

To enable the students to:
1. Provide hands on experience with regard to different areas in food industries.
2. Acquaint and gain knowledge related to production, unit operations, quality control and marketing aspects of food industry.
3. Gain knowledge associated with basic process requirements, documentation and maintenance of a food industry.
4. Emphasize the prominence of food plant sanitation, food safety, standards, laws and regulation in food industry.

Unit-I

- Introduction, Status of Global food industry, Indian food industry.
- Components of Food Industry - Agriculture, Food processing, Food distribution, Regulation, Financial services, research and Development, marketing.
- Scope for Expansion, Future priorities in Food Production, challenges.

Unit – II

- Maintenance - staff and plant operators; Preventive maintenance; Guidelines for good maintenance & safety precautions; Work place improvement through '5S.
- Book keeping, Record maintenance, Audit Check List Preparation of HACCP based SOP checklists for Maintenance and sanitation.
- Concept of GMP.

Unit- III

- Wastewater and solid waste treatment: - Waste-types-solid and liquid waste characterization, physical, chemical, biological, aerobic, anaerobic, primary, secondary and tertiary (advanced) treatments.
- Handling customer and complains - types of complains, handling customer complaints, evaluation and solution of problem, report making.

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VI
(Examination to be held in May 2025, 2026, 2027)
Major Course (Theory)

Course Code: UMJFST-604
Credits: 03
Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Course Title: Food Industry Management
Total No. of Lectures: 45

Unit - IV

- Government initiatives - MOFPI, objectives and functions, schemes for Infrastructure development, technology up-gradation & modernization, human resources development and R&D
- PMKSY – Pradhan Mantri Kissan Sampada Yojna Scheme

References:

1. Balla, J., Balog, J., Šafarikova, J., &Štefanikova, M. (2003). Quality Management in the Machinery Maintenance in Agricultural and Food Sector.
2. Marriott, N. G., Gravani, R. B., & Schilling, M. W. (2006). Principles of food sanitation (Vol. 22). New York: Springer.
3. Kelly, A. (2006). Plant maintenance management set. Elsevier.
4. Khatkar, B. S. (Ed.). (2007). Food Science and Technology. Daya Books.
5. Hubbard, M. R. (2012). Statistical quality control for the food industry. Springer Science & Business Media.

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VI
(Examination to be held in May 2025, 2026, 2027)
Major Course (Practical)

Course Code: UMJFST-604 **Course Title:** Food Industry Management
Credits: 01
Maximum Marks: 25

List of Practical:

1. Visit to a Food Plant
2. Report Writing – Write a detailed report about setting up of a Food Plant.

Scheme of Examination:

THEORY		
DESCRIPTION	**TIME ALLOTTED**	**MARKS**
Mid Semester Assessment Test shall be conducted by the course coordinator after completion of the syllabus up to 50% and the pattern of the examination shall be decided by the respective Board of Studies	1½ Hours	15
End Semester University Examination shall be conducted for entire syllabus. The break up is as under: **Section A** shall consist Four (4) short answer questions having one question from each unit. The students are required to attempt all questions. Each question shall be of 3 Marks. **Section B** shall consist Eight (8) long answer questions having two questions from each unit. The students are required to attempt one question from each unit. Each question shall be of 12 Marks.	3 Hours	60
PRACTICAL/TUTORIAL		
Daily evaluation of practical's/tutorials/Viva voce/Records etc.	10 Marks for Continuous Assessment	
Final Examination **Note: The BOS shall device the mechanism of Final examination.**	15 Marks for Final examination	

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VI
(Examination to be held in May 2025, 2026, 2027)
Minor Course (Theory)

Course Code: UMIFST-605
Credits: 03
Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Course Title: Food Product Development
Total No. of Lectures: 45

Course learning outcomes:

1. Understand the process of development of food product.
2. Understand the role of research and development in food product development and food manufacture.
3. Apply the knowledge gained in various situations.
4. Development new food product which are nutritious, cost effective and marketable

Unit -I

- Basics of Food Product Development: Definition, Classification of new food product, Reason for new food, Product development– social concerns, Health concerns.
- Product development- Market place influences, Technological influences, Governmental influences, Product life cycle, New Product Development team, concept of market and marketing

Unit -II

- Idea Generation, Idea Screening, Concept testing, Business analysis, Product development, Test marketing, Commercialization., Market and literature survey to identify the concepts of new products, Development of prototype product and standardization of formulation process, proximate analysis, shelf-life study of new product, Cost analysis and final project report

Unit -III

- Standardization and large-scale preparation. Chemical and physical properties of foods- shelf-life studies shelf predictions.
- Storage and transportation – Types and mode of transportation optimization of Transport taking into account the types of product distance storage facilities, Equipment and space

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VI
(Examination to be held in May 2025, 2026, 2027)
Minor Course (Theory)

Course Code: UMIFST-605
Credits: 03
Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Course Title: Food Product Development
Total No. of Lectures: 45

Unit - IV

- Government initiatives - MOFPI, objectives and functions, schemes for Infrastructure development, technology up-gradation & modernization, human resources development and R&D
- Sensory Evaluation of Foods: Definition and concept.
- Threshold Tests for Basic Taste
- Selection of sensory panel

- Different types of sensory tests:
  - Paired Comparison Test.
  - Rank Test
  - Score Test
  - Hedonic Scale

References:

1. Food Product Development, M Earle, R Earle, A Anderson, Woodhead Publishing, (2001).

2. New Food Product Development: from Concept to Marketplace, Gordon W Fuller, CRC Press, 3rd edition, (2011).

3. Methods for Developing the New Food Products, Fadi Aramouni, Kathryn Deschenes, Desteh Publications, 2nd edition, (2017).

4. Strategies for Formulations Development: A step-by-step Guide using JMP, Ronald D. Snee, Roger W. Hoeri, SAS Institute; revised edition, (2016).

5. An Integrated Approach to New Food Product Development, Howard R. Moskowitz, I. Sam Saguy, Tim Straus, CRC Press, (2009).

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VI
(Examination to be held in December 2024, 2025, 2026)
Minor Course (Practical)

Course Code: UMIFST-605 **Course Title:** Food Product Development
Credits: 01
Maximum Marks: 25

List of Practical:

1. To conduct the market research for various new products available.
2. Development of a new product
3. Determination of the taste threshold for the different sensations – sweet, salty, sour
4. To Conduct a descriptive analysis of a given sample of Food (Bread/Biscuit etc.) on the basis of its sensory attributes
5. To perform Hedonic Scale Test / Rank Test / Score Test

Scheme of Examination:

THEORY		
DESCRIPTION	**TIME ALLOTTED**	**MARKS**
Mid Semester Assessment Test shall be conducted by the course coordinator after completion of the syllabus up to 50% and the pattern of the examination shall be decided by the respective Board of Studies	1½ Hours	15
End Semester University Examination shall be conducted for entire syllabus. The break up is as under: **Section A** shall consist Four (4) short answer questions having one question from each unit. The students are required to attempt all questions. Each question shall be of 3 Marks. **Section B** shall consist Eight (8) long answer questions having two questions from each unit. The students are required to attempt one question from each unit. Each question shall be of 12 Marks.	3 Hours	60
PRACTICAL/TUTORIAL		
Daily evaluation of practical's/tutorials/Viva voce/Records etc.	10 Marks for Continuous Assessment	
Final Examination **Note: The BOS shall device the mechanism of Final examination.**	15 Marks for Final examination	

Four Year Under Graduate Programme (FYUGP) as per NEP – 2020

Food Science and Quality Control

Semester - VII

(Examination to be held in Dec 2025, 2026 and 2027)

S. No.	Course Type	Course No.	Course Title	Credits (Theory + Practical)	Marks				Total Marks
					Theory		Practical/Tutorials		
1	Major	UMJFST-701	Food Biotechnology	(3 + 1)	Mid Semester 15 Marks	End Exam 60 Marks	Assessment 10 Marks	Exam 15 Marks	75 + 25 = **100**
2	Major	UMJFST-702	Novel Techniques in Food Processing Sector	(3 + 1)	Mid Semester 15 Marks	End Exam 60 Marks	Assessment 10 Marks	Exam 15 Marks	75 + 25 = **100**
3	Major	UMJFST-703	Food Adulteration and Testing and Analytical Instrumentation	(3 + 1)	Mid Semester 15 Marks	End Exam 60 Marks	Assessment 10 Marks	Exam 15 Marks	75 + 25 = **100**
4	Major	UMJFST-704	Live Stock and Sea Food Technology	(3 + 1)	Mid Semester 15 Marks	End Exam 60 Marks	Assessment 10 Marks	Exam 15 Marks	75 + 25 = **100**
5	Minor	UMIFST-705	Food Biotechnology	(3 + 1)	Mid Semester 15 Marks	End Exam 60 Marks	Assessment 10 Marks	Exam 15 Marks	75 + 25 = **100**

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VII
(Examination to be held in December 2025, 2026, 2027)
Major Course (Theory)

Course Code: UMJFST-701
Credits: 03
Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Course Title: Food Biotechnology
Total No. of Lectures: 45

Course learning outcomes:

1. Inculcate basic knowledge of Food biotechnology and its applications in Food Processing Industry
2. Learn about the production of different food products by Microbial means.
3. Study the Fundamentals of Tissue Culture and Genetic Engineering
4. Understand the importance of Biotechnology in Food processes.
5. Learn about the microbial production of organic acids, vitamins and bio-pigments.
6. Understand the basics of Tissue Culture, Genetic Engineering and Genetically Modified Foods.

Unit-I

- Introduction, history, scope and present status of biotechnology in India with reference to Food Technology.
- Fermentation, types of fermentation: solid and submerged fermentation. Bioreactor, types of bioreactors, Advantages and disadvantages, applications and design aspects of bioreactors used in food industry.

Unit-II

- Biotechnological methods for the production of organic acids, vitamins and bio-pigments (with reference to the microorganisms involved, substrates used, optimum process parameters and their applications)
- Production of single cell proteins, microbial lipids (microorganisms involved, raw materials, advantages, commonly used methods, safety concerns)

Unit-III

- Sources of enzymes, advantages of microbial enzymes, production, extraction and purification of enzymes.
- Biotechnological approach for the production of fermented food products, Beer, Wine, Tofu, Soy Sauce, Tempeh, Kefir.

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VII
(Examination to be held in December 2025, 2026, 2027)
Major Course (Theory)

Course Code: UMJFST-701
Credits: 03
Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Course Title: Food Biotechnology
Total No. of Lectures: 45

Unit-IV

- Tissue culture technology and its application, medium used in tissue culture, somatic hybridization, protoplast fusion, secondary metabolite production
- Structure of DNA and RNA, Mutation, Mutagens, Types of Mutations and applications of Mutations in Strain Improvement.
- Genetic Engineering and applications, Gene Cloning procedures-general outline, Recombinant DNA Technology, Genetically Modified Foods and their applications. Safety issues related to Genetically Modified Foods

References:

1. Crueger and Crueger, Biotechnology: A Textbook of Industrial Microbiology, Sinauer Associates Inc.,U.S.
2. Frazier, W.S. and Weshoff, D.C., Food Microbiology, McGraw Hill Book Co., New York
3. Roger, A., Gordon, B. and John, T, Food Biotechnology, Cambridge University Press
4. Prescott & Dunn Industrial Microbiology, CBS Publishers and Distributors

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VII
(Examination to be held in December 2025, 2026, 2027)
Major Course (Practical)

Course Code: UMJFST-701 **Course Title:** Food Biotechnology
Credits: 01
Maximum Marks: 25

List of Practical:

1. Preparation of media, sterilization,
2. Serial dilution and enumeration
3. Plating Techniques
4. Gram Staining
5. ELISA (enzyme-linked immunosorbent assay) technique for detecting and quantifying soluble substances such as peptides, proteins, antibodies, and hormones.

Scheme of Examination:

THEORY		
DESCRIPTION	**TIME ALLOTTED**	**MARKS**
Mid Semester Assessment Test shall be conducted by the course coordinator after completion of the syllabus up to 50% and the pattern of the examination shall be decided by the respective Board of Studies	1½ Hours	15
End Semester University Examination shall be conducted for entire syllabus. The break up is as under: **Section A** shall consist Four (4) short answer questions having one question from each unit. The students are required to attempt all questions. Each question shall be of 3 Marks. **Section B** shall consist Eight (8) long answer questions having two questions from each unit. The students are required to attempt one question from each unit. Each question shall be of 12 Marks.	3 Hours	60
PRACTICAL/TUTORIAL		
Daily evaluation of practical's/tutorials/Viva voce/Records etc.	10 Marks for Continuous Assessment	
Final Examination **Note: The BOS shall device the mechanism of Final examination.**	15 Marks for Final examination	

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VII
(Examination to be held in December 2025, 2026, 2027)
Major Course (Theory)

Course Code: UMJFST-702

Course Title: Novel Techniques In Food Processing Sector

Credits: 03
Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Total No. of Lectures: 45

Course learning outcomes:

1. Understand about various emerging technologies in food processing
2. Understand the mechanism of innovative techniques for the improvement of production yield and quality
3. Learn the applications of novel processing techniques in the processing &preservation of foods.
4. Comprehend the concepts of High-Pressure Processing and Ultrasound techniques in food processing and microbial deactivation
5. Study the application of microwave and radio frequency wave technology in food processing
6. Understand the membrane technology and Super critical fluid extraction process in food sector
7. Learn the significance and application of Nanotechnology in food sector

Unit-I

- Concept of minimal processing of fruits and vegetables. Natural preservation systems for foods. Synergistic & Antagonistic effects of food mixtures.
- Introduction, scope and application of High-Pressure Processing (HPP) of foods. Mechanism of microbial inactivation through HPP. Commercial HPP equipment.
- Ultrasonics in Food Processing: Principle, properties, equipment and its applications. Microbial inactivation by ultrasound

Unit-II

- Food Processing by Radio Frequency Electric Fields and its applications: Pulse Electric Field (PFE), Moderate Electric Field (MEF).
- Use of Electromagnetic Radiations in Food Processing: Ohmic heating, IR heating, Microwave heating, Inductive heating.

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VII
(Examination to be held in December 2025, 2026, 2027)
Major Course (Theory)

Course Code: UMJFST-702

Course Title: Novel Techniques In Food Processing Sector

Credits: 03
Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Total No. of Lectures: 45

Unit-III

- Advances in Membrane Technology and their industrial applications in Food Processing: Microfiltration, Ultrafiltration, Nanofiltration, Reverse Osmosis. Principle and Equipment involved.
- Principle, application, advantages and disadvanteages of Super Critical Fluid Extraction (SCFE) process. Types of Super critical fluids and their properties, Methods of Extraction. Applications in Food Processing Sector.

Unit-IV

- Concept and applications of Nanotechnology in Food Processing, its semblance and contribution in food industry along with advantages and limitations.
- Significance of Nano particles, Nano composites, Nano emulsions, Nano structured materials and Nano sensors and their applications in Food Processing Sector
- Novel applications in food analysis: Atomic Absorption Spectroscopy (AAS), Fourier Transform Infrared (FTIR), X-ray Diffraction (XRD), Differential Scanning Calorimetry (DSC), Scanning Electron Microscopy (SEM), e-sensors and biosensors.

References:

1. Desrosier Norman W," The Technology of Food Preservation", Westport, Conn. AVI Pub. Co. (4th Edition) 1977 / 2004
2. Norman N.Potter, Joseph H.Hotchkiss, " Food Science", 5th Edition, CBS Publishers & Distributors Pvt. Ltd. 2007
3. Sivasankar, B.,"Food Processing and Preservation", Prentice Hall of India Pvt.Ltd., New Delhi. 2002
4. P J Fellows, "Food Processing Technology", 3rd Edition. Woodhead Publishing 2009
5. Gould G. W. "New Methods of Food Preservation", Springer U.S 1995
6. Gustavo V. Barbosa-Canovas,Maria S. Tapia,M. Pilar Cano,,"Novel Food Processing Technologies", CRC press 2004

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VII
(Examination to be held in December 2025, 2026, 2027)
Major Course (Theory)

Course Code: UMJFST-702

Course Title: Novel Techniques In Food Processing Sector

Credits: 03
Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Total No. of Lectures: 45

7. Tewari G, Juneja V.K.,"Advances in Thermal and Non-Thermal Food Preservation", Wiley Blackwell Press 2007

8. https://swayam.gov.in/ Category: Engineering & Technology, Sub Category: Agriculture and Food Engineering

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VII
(Examination to be held in December 2025, 2026, 2027)
Major Course (Practical)

Course Code: UMJFST-702

Course Title: Novel Techniques In Food Processing Sector

Credits: 01
Maximum Marks: 25

List of Practical:

1. Microwave application in Thermal Food Processing
2. Demonstration of Atomic Absorption Spectroscopy (AAS)/Fourier Transform Infrared (FTIR)/X-ray Diffraction (XRD)/Differential Scanning Calorimetry (DSC)/Scanning Electron Microscopy (SEM)
3. Visit to Instrumentation Laboratory.

Scheme of Examination:

THEORY		
DESCRIPTION	**TIME ALLOTTED**	**MARKS**
Mid Semester Assessment Test shall be conducted by the course coordinator after completion of the syllabus up to 50% and the pattern of the examination shall be decided by the respective Board of Studies	1½ Hours	15
End Semester University Examination shall be conducted for entire syllabus. The break up is as under: **Section A** shall consist Four (4) short answer questions having one question from each unit. The students are required to attempt all questions. Each question shall be of 3 Marks. **Section B** shall consist Eight (8) long answer questions having two questions from each unit. The students are required to attempt one question from each unit. Each question shall be of 12 Marks.	3 Hours	60
PRACTICAL/TUTORIAL		
Daily evaluation of practical's/tutorials/Viva voce/Records etc.	10 Marks for Continuous Assessment	
Final Examination **Note: The BOS shall device the mechanism of Final examination.**	15 Marks for Final Examination	

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VII
(Examination to be held in December 2025, 2026, 2027)
Major Course (Theory)

Course Code: UMJFST-703

Course Title: Food Adulteration & Testing and Analytical Instrumentation

Credits: 03

Total No. of Lectures: 45

Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Course learning outcomes:

1. Understand various Food Laws, food Adulteration, Composition & quality of food products
2. Study various analytical techniques like TLC, paper Chromatography, atomic absorption, fluorimetry

Unit-I

- Food laws: Voluntary, Mandatory- National and International
- Role of Voluntary Agencies and Legal aspects of Consumer Protection
- Food Standards, Food Adulteration

Unit-II

- Composition and Quality criteria for the following: -
- Milk and Milk Products, Oil and Fats, Spices and Condiments, Food grain, Flours, Canned foods
- Fruits and Vegetable products, Flesh food, Sugar and Preserves, Beverages- Alcoholic and Non-Alcoholic.

Unit-III

- Radioactive Tracer Techniques, Radioactive Counter Gas and Liquid Scintillation
- Fluorimetry- Thiamin& Riboflavin
- Spectrophotometry- Phosphorus & Ascorbic Acid

Unit-IV

- Principles and Techniques of Separation Methods- Chromatography (TLC, GLC, HPLC).
- Electrophoresis-Paper, Moving boundary, Agar, β-Carotene.
- Atomic Absorption- Iron, Calcium/ Any Trace element
- Measurement of Enzyme Activity- Principles of any enzyme to be estimated

References:

1. Principles & Techniques of Practical biochemistry by Wilson N . Walker

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VII
(Examination to be held in December 2025, 2026, 2027)
Major Course (Practical)

Course Code: UMJFST-703

Course Title: Food Adulteration & Testing and Analytical Instrumentation

Credits: 01
Maximum Marks: 25

List of Practical:

A. Adulteration & testing of foods:
   1. Milk & milk products
   2. Spices
   3. Pulses
   4. Fats & oils
   5. Sedimentation value of Maida
   6. Specific gravity of milk.

B. Titratable Acidity of Milk & Lemon

C. Chromatography:
   1. Paper chromatography
   2. TLC

Scheme of Examination:

THEORY		
DESCRIPTION	**TIME ALLOTTED**	**MARKS**
Mid Semester Assessment Test shall be conducted by the course coordinator after completion of the syllabus up to 50% and the pattern of the examination shall be decided by the respective Board of Studies	1½ Hours	15
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PRACTICAL/TUTORIAL		
Daily evaluation of practical's/tutorials/Viva voce/Records etc.	10 Marks for Continuous Assessment	
Final Examination **Note: The BOS shall device the mechanism of Final examination.**	15 Marks for Final examination	

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VII
(Examination to be held in December 2025, 2026, 2027)
Major Course (Theory)

Course Code: UMJFST-704
Credits: 03
Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Course Title: Live Stock and Sea Food Technology
Total No. of Lectures: 45

Course learning outcomes:

1. Understand the grades, structure, composition and nutritional quality of various livestock and seafood
2. Comprehend the slaughtering, carcass processing, post-mortem changes.
3. Illustrate the processing technology of meat, poultry, fish and eggs.
4. Develop skills in value addition of meat, fish and poultry products.

Unit-I

Meat and Meat Products Technology:

- Present Status of Meat Industry in India and Abroad.
- Judging & grading of live meat animals (Buffalo, Sheep, Goat, Pigs).
- Stunning, slaughtering and dressing operations of food animals - Cattle, Buffalo, Sheep, Goat, Pigs, Rabbits and Poultry.
- Structure, Chemical composition and nutritive value of muscle of food animals including poultry - Proportion of muscular tissues in different meat animals-Associative connective tissues- Muscle fiber.

Unit-II

Meat Processing and preservation

- Conversion of muscle into meat- Post mortem changes in meat -Rigor mortis- Protein denaturation-Proteolysis-Physico-chemical properties of meat - Factors influencing meat quality- PSE and DFD meat-Pre rigor processing.
- Principles of Meat Preservation - Moisture Control - Temperature Control- Direct microbial inhibition.
- Modern processing techniques for Meat Processing- Concept of meat emulsification- Comminution-Restructuring- Retort pouch Processing-Value Added and Processed Meat Products

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VII
(Examination to be held in December 2025, 2026, 2027)
Major Course (Theory)

Course Code: UMJFST-704
Credits: 03
Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Course Title: Live Stock and Sea Food Technology
Total No. of Lectures: 45

Unit-III

Egg and Poultry Products Technology:

- Preservation and maintenance of egg - Egg cleansing - Oil treatment - Cold storage- Thermo stabilization- Immersion in liquids - Value Added Egg Products.
- Candling and Grading of eggs.
- Pre slaughter handling, transportation and primary and secondary processing of poultry.
- Evaluation and grading of dressed carcasses of various food animals including poultry
- Processing and preservation of poultry meat products.

Unit-IV

Sea Food Technology

- Present status of Fish, Shrimp and Prawns processing in India.
- Classification of Fish, commonly cultivated fish, shrimp and prawns.
- Selection, Grading of Fish.
- Factors affecting the quality of fish, Shrimp and Prawns. Processing and preservation of fish and other products.
- Value Added Sea Food Products.

References:

1. Aitkeer, A.(1990). Fish handling and Processing, 3rd, Aberdeen Ministry of Agriculture, Edinburgh.

2. Hall, G.M. (1992). Fish Processing Technology, blackie. New York.

3. Lawrie,R.A.Lawrie' s. (1998).Meat Science, 5th Ed, Woodhead Publisher, England.

4. Parkhurst&Mountney.(1997). Poultry Meat and Egg Production, CBS Publication, New Delhi.

5. Pearson &Gillet. (1997). Processed Meats,3 Ed, CBS Publication, New Delhi.

6. Sen,D.P.(2005). Advances in Fish Processing Technology, Allied Publishers Pvt. Limited.

7. Shahidi,F. and Botta,J.R. (1994).Seafoods: Chemistry, Processing, Technology and Quality, Blackie Academic &Professional,London.

8. ShaiBarbut. (2005). Poultry Products Processing, CRC Press.

Food Science and Quality Control
Semester VII
(Examination to be held in December 2025, 2026, 2027)
Major Course (Practical)

Course Code: UMJFST-704 **Course Title:** Live Stock and Sea Food Technology
Credits: 01
Maximum Marks: 25

9. Stadelman,W.J. and Owen, J.C.(2002).Egg Science and Technology, 4th Ed. CBS Publication New Delhi.

List of Practical:

1. Tests for determination of physico- chemical quality of meat and meat products:
   a. pH, Extract Release Volume (ERV)
   b. Meat Swelling capacity, Total Volatile Basic Nitrogen (TVBN),
   c. Picric acid turbidity, Dye reduction capacity.
2. Determination of Nitrate in meat
3. Test for presence of poly phosphates
4. Determination of total volatile bases in frozen fish
5. Determination of moisture in dried fish
6. Determination of sodium chloride in dried fish
7. Visit to modern Abattoir

Scheme of Examination:

THEORY		
DESCRIPTION	**TIME ALLOTTED**	**MARKS**
Mid Semester Assessment Test shall be conducted by the course coordinator after completion of the syllabus up to 50% and the pattern of the examination shall be decided by the respective Board of Studies	1½ Hours	15
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PRACTICAL/TUTORIAL		
Daily evaluation of practical's/tutorials/Viva voce/Records etc.	10 Marks for Continuous Assessment	
Final Examination **Note: The BOS shall device the mechanism of Final examination.**	15 Marks for Final examination	

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VII
(Examination to be held in December 2025, 2026, 2027)
Minor Course (Theory)

Course Code: UMIFST-705
Credits: 03
Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Course Title: Food Biotechnology
Total No. of Lectures: 45

Course learning outcomes:

1. Provide basic knowledge of Food biotechnology and its applications in Food Processing Industry
2. Learn about the production of different food products by Microbial means.
3. Study the Fundamentals of Tissue Culture and Genetic Engineering
4. Understand the importance of Biotechnology in Food processes.
5. Understand the microbial production of organic acids, vitamins and bio-pigments.
6. Study the basics of Tissue Culture, Genetic Engineering and Genetically Modified Foods.

Unit-I

- Introduction, history, scope and present status of biotechnology in India with reference to Food Technology.
- Fermentation, types of fermentation: solid and submerged fermentation. Bioreactor, types of bioreactors, Advantages and disadvantages, applications and design aspects of bioreactors used in food industry.

Unit-II

- Biotechnological methods for the production of organic acids, vitamins and bio-pigments (with reference to the microorganisms involved, substrates used, optimum process parameters and their applications)
- Production of single cell proteins, microbial lipids (microorganisms involved, raw materials, advantages, commonly used methods, safety concerns)

Unit-III

- Sources of enzymes, advantages of microbial enzymes, production, extraction and purification of enzymes.
- Biotechnological approach for the production of fermented food products, Beer, Wine, Tofu, Soy Sauce, Tempeh, Kefir.

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VII
(Examination to be held in December 2025, 2026, 2027)
Minor Course (Theory)

Course Code: UMIFST-705
Credits: 03
Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Course Title: Food Biotechnology
Total No. of Lectures: 45

Unit-IV

- Tissue culture technology and its application, medium used in tissue culture, somatic hybridization, protoplast fusion, secondary metabolite production
- Structure of DNA and RNA, Mutation, Mutagens, Types of Mutations and applications of Mutations in Strain Improvement.
- Genetic Engineering and applications, Gene Cloning procedures-general outline, Recombinant DNA Technology, Genetically Modified Foods and their applications. Safety issues related to Genetically Modified Foods

References:

1. Crueger and Crueger , Biotechnology: A Textbook of Industrial Microbiology, Sinauer Associates Inc.,U.S.
2. Frazier, W.S. and Weshoff, D.C., Food Microbiology, McGraw Hill Book Co., New York
3. Roger, A., Gordon, B. and John, T, Food Biotechnology, Cambridge University Press
4. Prescott & Dunn Industrial Microbiology, CBS Publishers and Distributors

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VII
(Examination to be held in December 2025, 2026, 2027)
Minor Course (Practical)

Course Code: UMIFST-705 **Course Title:** Food Biotechnology
Credits: 01
Maximum Marks: 25

List of Practical:

1. Preparation of media, sterilization,
2. Serial dilution and enumeration
3. Plating Techniques
4. Gram Staining
5. ELISA (enzyme-linked immunosorbent assay) technique for detecting and quantifying soluble substances such as peptides, proteins, antibodies, and hormones.

Scheme of Examination:

THEORY		
DESCRIPTION	**TIME ALLOTTED**	**MARKS**
Mid Semester Assessment Test shall be conducted by the course coordinator after completion of the syllabus up to 50% and the pattern of the examination shall be decided by the respective Board of Studies	1½ Hours	15
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PRACTICAL/TUTORIAL		
Daily evaluation of practical's/tutorials/Viva voce/Records etc.	10 Marks for Continuous Assessment	
Final Examination **Note: The BOS shall device the mechanism of Final examination.**	15 Marks for Final examination	

Four Year Under Graduate Programme (FYUGP) as per NEP – 2020

Food Science and Quality Control

Semester – VIII (Honours)

(Examination to be held in May 2026, 2027, 2028)

S.No.	Course Type	Course No.	Course Title	Credits (Theory+ Practical)	Marks				Total Marks
					Theory		Practical/ Tutorials		
1	Major	UMJFST-801	Research Methodology	(3 + 1)	Mid Semester 15 Marks	End Exam 60 Marks	Assessment 10 Marks	Exam 15 Marks	75 + 25 = **100**
2	Major	UMJFST-802	ICT Application in Food Industry	(3 + 1)	Mid Semester 15 Marks	End Exam 60 Marks	Assessment 10 Marks	Exam 15 Marks	75 + 25 = **100**
3	Major	UMJFST-803	Food Storage Engineering	(3 + 1)	Mid Semester 15 Marks	End Exam 60 Marks	Assessment 10 Marks	Exam 15 Marks	75 + 25 = **100**
4	Major	UMJFST-804	Entrepreneurship Development	(3 + 1)	Mid Semester 15 Marks	End Exam 60 Marks	Assessment 10 Marks	Exam 15 Marks	75 + 25 = **100**
5	Minor	UMIFST-805	Novel Techniques in Food Processing Sector	(3 + 1)	Mid Semester 15 Marks	End Exam 60 Marks	Assessment 10 Marks	Exam 15 Marks	75 + 25 = **100**

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VIII (Honours)
(Examination to be held in May 2026, 2027, 2028)
Major Course (Theory)

Course Code: UMJFST-801
Credits: 03
Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Course Title: Research Methodology
Total No. of Lectures: 45

Course learning outcomes:

1. To understand different types of research like experimental, survey, applied, action research etc., and differentiate advantages and disadvantages each type of research.
2. To acquire knowledge in developing a research proposal in the appropriate scientific style.
3. To Understand different types of searches and can compare the advantages and disadvantages of each type of research
4. To critically know the procedures for identifying an ideal sample for scientific research and able to prepare a research proposal in the appropriate scientific style.

Unit-I

Nature and Purpose of Research:

- Meaning of research, aim, Nature and scope of research, Prerequisites of research, Types of research: Exploratory, Descriptive and Experimental.
- Research Problem: Types of research problems, Characteristics of a good research problem,
- Hypothesis: Meaning and types of hypotheses, Research proposal or synopsis.
- Research Methods: Qualitative and Quantitative

Unit-II

Review of Literature:

- Purpose of the review, Identification of the literature, organizing the literature.
- Data Collection and Analysis: Types of data, Methods of data collection, Sample and Population, Sampling Techniques, Characteristics of a good sample.
- Tools of Data Collection: Observation method, Interview, Questionnaire, various rating scales, Characteristics of good research tools.

Unit-III

Descriptive Statistics:

- Tabulation, Organization, and Tabulation and Graphical Representation of Quantitative data, Measures of Central Tendencies: Mean, Median, Mode Measures of Variability: Range, Quartile Deviation, Standard Deviation, and Coefficient of variation.
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Food Science and Quality Control
Semester VIII (Honours)
(Examination to be held in May 2026, 2027, 2028)
Major Course (Theory)

Course Code: UMJFST-801
Credits: 03
Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Course Title: Research Methodology
Total No. of Lectures: 45

- Normal Probability Distribution: Properties of normal probability curve, Skewness and Kurtosis, Hypothesis Testing, Generalization and Interpretation.

Unit-IV

Research Report:

- Structure and Components of Research Report, Types of Report, Characteristics of Good Research Report, Bibliographical Entries, Research Ethics

References:

1. DRM, a design research methodology by Luciene TM Blessing and Amaresh Chakrabarti
2. Fundamental of Research Methodology and Statistics by Yogesh Kumar Singh
3. Essential of Research Design and Methodology by Geoffrey Marczyk, David DeMatteo, David Festinger

Food Science and Quality Control
Semester VIII (Honours)
(Examination to be held in May 2026, 2027, 2028)
Major Course (Practical)

Course Code: UMJFST-801 **Course Title:** Research Methodology
Credits: 01
Maximum Marks: 25

List of Practical:

1. Identification of different variables in specialization of study.
2. Framing of hypothesis-Null and alternate Hypothesis
3. Preparation of schedule/questionnaire.
4. Preparation of research proposal
5. Study of an article in a journal-Abstract, Methodology, Results and Bibliography

Scheme of Examination:

THEORY		
DESCRIPTION	**TIME ALLOTTED**	**MARKS**
Mid Semester Assessment Test shall be conducted by the course coordinator after completion of the syllabus up to 50% and the pattern of the examination shall be decided by the respective Board of Studies	1½ Hours	15
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PRACTICAL/TUTORIAL		
Daily evaluation of practical's/tutorials/Viva voce/Records etc.	10 Marks for Continuous Assessment	
Final Examination **Note: The BOS shall device the mechanism of Final examination.**	15 Marks for Final examination	

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VIII (Honours)
(Examination to be held in May 2026, 2027, 2028)
Major Course (Theory)

Course Code: UMJFST-802

Course Title: ICT Application in Food Industry

Credits: 03
Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Total No. of Lectures: 45

Course learning outcomes:

1. To understand role of computer technology in food the field of food science.
2. To acquire knowledge of various software being used in food Industry.
3. To Understand use of various ICT tools in the field of Food Science research.

Unit-I

- Importance of computerization in Food Industry.
- Operating Environment and information systems for various types of food industries,
- Supervisory Control and data acquisition (SCADA): SCADA Systems hardware, firmware, software and protocols, landlines, local area network systems, Modems, Spreadsheet applications, data interpretation and solving problem, Preparation of Charts

Unit-II

- Use of macros to solve engineering problems, use of add-ins, use of solvers
- Web hosting and web page design. File Transfer protocol (FTP), Online food process control from centralized server system in Processing Plant.

Unit-III

- Use of MATLAB in food industry, Computing with MATLAB, Script files and editor/debugger, MATLAB help system, problem solving methodologies, numeric, cell, array, matrix operations, user defined functions, application to stimulations, Plotting and model building in MATLAB

Unit-IV

- Introduction to toolboxes useful to food industry, curve fitting toolbox, fuzzy logic toolbox, neural network toolbox, Image processing toolbox, statistical toolbox
- Introduction to Computational Fluid Dynamics (CFD)
- Concept of LabVIEW.

Food Science and Quality Control
Semester VIII (Honours)
(Examination to be held in May 2026, 2027, 2028)
Major Course (Theory)

Course Code: UMJFST-802

Course Title: ICT Application in Food Industry

Credits: 03
Total No. of Lectures: 45
Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

References:

- R PAUL SINGH, 2014 Computer Application in Food Technology: Use of Spreadsheet in Graphical, Statistical and Process Analysis. Academic Press, London.
- WILLIAM J PALM III, 2011 Introduction to MATLAB for Engineers, 3rd Edition McGraw-Hill Companies, Inc. NY USA
- Da-Wen Sun, 2007 Computational Fluid Dynamics in Food Processing, CRC Press, Boca Raton, Fl, USA
- Nigel Chapman and Jemmy Chapman. 2006, Web Design. A complete Introduction. John Wiley & Sons, USA

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VIII (Honours)
(Examination to be held in May 2026, 2027, 2028)
Major Course (Practical)

Course Code: UMJFST-802 **Course Title:** ICT Application in Food Industry
Credits: 01
Maximum Marks: 25

List of Practical:

1. Introduction to various features in spreadsheet.
2. Introduction to MATLAB
3. Introduction to GAMBIT Software.
4. Introduction to FLUENT Software
5. Introduction to LabVIEW and NI-DAQ

Scheme of Examination:

THEORY		
DESCRIPTION	**TIME ALLOTTED**	**MARKS**
Mid Semester Assessment Test shall be conducted by the course coordinator after completion of the syllabus up to 50% and the pattern of the examination shall be decided by the respective Board of Studies	1½ Hours	15
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PRACTICAL/TUTORIAL		
Daily evaluation of practical's/tutorials/Viva voce/Records etc.	10 Marks for Continuous Assessment	
Final Examination **Note: The BOS shall device the mechanism of Final examination.**	15 Marks for Final examination	

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VIII (Honours)
(Examination to be held in May 2026, 2027, 2028)
Major Course (Theory)

Course Code: UMJFST-803
Credits: 03
Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Course Title: Food Storage Engineering
Total No. of Lectures: 45

Course learning outcomes:

1. To understand the scientific concept of storage of food
2. To acquire knowledge of various types of spoilages that occur during storage
3. To understand the structural and functional design aspects of Silos.

Unit-I

- Storage: Importance of Scientific storage, post-harvest physiology of semi-perishables and perishables, climacteric and non-climacteric fruits, respiration, ripening, changes during ripening, ethylene bio-synthesis.
- Damages: Direct damages, indirect damages, causes of spoilage in storage (moisture, temperature, humidity, respiration loss, heat of respiration, sprouting).

Unit-II

- Destructive agents (rodents, birds, insects etc.), sources of infestation and control
- Storage structures: Traditional storage structures, improved storage structures, modern storage structures
- Farm Silos: Horizontal Silos, Tower Silos, Pit Silos, Trench Silos, Size and Capacity of Silos
- Storage of Grains: Respiration of grains, moisture and temperature changes in stored grains: conditioning of environment inside storage through ventilation.
- Aeration and stored grain management: Purpose of aeration, aeration theory, aeration system design, aeration system operation

Unit-III

- Storage pest and control: damage due to storage insects and pests, its control, seed coating, fumigation, Damage caused by rodents and its control
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Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VIII (Honours)
(Examination to be held in May 2026, 2027, 2028)
Major Course (Theory)

Course Code: UMJFST-803
Credits: 03
Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Course Title: Food Storage Engineering
Total No. of Lectures: 45

- Storage of perishables: Cold storage, Controlled and Modified atmospheric storage, hypobaric storage, evaporative cooling storage conditions for storage of perishable products, control of temperature and relative humidity inside storage.

Unit-IV

- Design of storage structures: Functional and structural design of grain storage structures, pressure theories, pressure distribution in the bin, grain storage loads pressure and capacities, warehouse and silos
- BIS specifications, functional, structural and thermal design of cold stores.

REFERENCES:

- P H Pandey. Principles and Practices of Agricultural Structures and Environmental Control. Kalyani Publishers Ludhiana
- Myer Kutz Hand book of Farm, Dairy and Food Machinery. William Andrew, Inc. Norwich, NY, USA
- A M Michael and T P Ojha.. Principles of Agricultural Engineering, Vol. I Jain Brothers, New Delhi

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VIII (Honours)
(Examination to be held in May 2026, 2027, 2028)
Major Course (Practical)

Course Code: UMJFST-803 **Course Title:** Food Storage Engineering
Credits: 01
Maximum Marks: 25

List of Practical:

1. Visit to Traditional Storage Structure.
2. Layout Design, sizing, capacity and drawing of traditional storage structure
3. Measurement of respiration rate of Fruits/Grains in the laboratory.
4. Study of Fumigation
5. Visit to FCI godown.
6. Visit to CA storage
7. Storage study in the MAP

Scheme of Examination:

THEORY		
DESCRIPTION	**TIME ALLOTTED**	**MARKS**
Mid Semester Assessment Test shall be conducted by the course coordinator after completion of the syllabus up to 50% and the pattern of the examination shall be decided by the respective Board of Studies	1½ Hours	15
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PRACTICAL/TUTORIAL		
Daily evaluation of practical's/tutorials/Viva voce/Records etc.	10 Marks for Continuous Assessment	
Final Examination **Note: The BOS shall device the mechanism of Final examination.**	15 Marks for Final examination	

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VIII (Honours)
(Examination to be held in May 2026, 2027, 2028)
Major Course (Theory)

Course Code: UMJFST-804
Credits: 03
Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Course Title: Entrepreneurship Development
Total No. of Lectures: 45

Course learning outcomes:

1. To acquire knowledge about Entrepreneurship
2. To understand the concept of planning and monitoring a project
3. To be able to prepare a viable project of setting up a new food processing Unit

Unit-I

- Entrepreneurship: Importance and growth, Characteristics and qualities of entrepreneur, Role of Entrepreneurship, ethics and social responsibilities.
- Entrepreneurship Development: Assessing overall business environment in the Indian economy, overview of Indian Social, Political and economic systems and their implications for decision making by individual Entrepreneurs.

Unit-II

- Globalization and the emerging business/ Entrepreneurial environment
- Concept of Entrepreneurship, Entrepreneurial and managerial characteristics, managing an enterprise, motivation and Entrepreneurship development

Unit-III

- Importance of Planning, monitoring, evaluation and follow up, Managing competition, Entrepreneurship development Programme, SWOT Analysis
- Generation, incubation and commercialization of ideas and innovations.
- Women Entrepreneurship: Role and importance, Problems

Food Science and Quality Control
Semester VIII (Honours)
(Examination to be held in May 2026, 2027, 2028)
Major Course (Theory)

Course Code: UMJFST-804
Credits: 03
Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Course Title: Entrepreneurship Development
Total No. of Lectures: 45

Unit-IV

- Planning and Evaluation of Project: Growth of firm, project identification and selection, factors inducing growth
- Project feasibility study: Post Planning of Project, Project planning and control.
- Government Schemes and Incentives for promotion of Entrepreneurship

REFERENCES:

- P H Pandey. Principles and Practices of Agricultural Structures and Environmental Control. Kalyani Publishers Ludhiana
- Myer Kutz Hand book of Farm, Dairy and Food Machinery. William Andrew, Inc. Norwich, NY, USA
- A M Michael and T P Ojha.. Principles of Agricultural Engineering, Vol. I Jain Brothers, New Delhi

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VIII (Honours)
(Examination to be held in May 2026, 2027, 2028)
Major Course (Practical)

Course Code: UMJFST-804 **Course Title:** Entrepreneurship Development
Credits: 01
Maximum Marks: 25

List of Practical:

1. Visit to Public Enterprise.
2. Visit to Private Enterprise
3. Visit to agro-processing/food business Centre.
4. SWOT analysis of Public Enterprise
5. Presentation of Project Proposal.

Scheme of Examination:

THEORY		
DESCRIPTION	**TIME ALLOTTED**	**MARKS**
Mid Semester Assessment Test shall be conducted by the course coordinator after completion of the syllabus up to 50% and the pattern of the examination shall be decided by the respective Board of Studies	1½ Hours	15
End Semester University Examination shall be conducted for entire syllabus. The break up is as under: **Section A** shall consist Four (4) short answer questions having one question from each unit. The students are required to attempt all questions. Each question shall be of 3 Marks. **Section B** shall consist Eight (8) long answer questions having two questions from each unit. The students are required to attempt one question from each unit. Each question shall be of 12 Marks.	3 Hours	60
PRACTICAL/TUTORIAL		
Daily evaluation of practical's/tutorials/Viva voce/Records etc.	10 Marks for Continuous Assessment	
Final Examination/Presentation **Note: The BOS shall device the mechanism of Final examination.**	15 Marks for Final examination	

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VIII (Honours)
(Examination to be held in May 2026, 2027, 2028)
Minor Course (Theory)

Course Code: UMIFST-805

Course Title: Novel Techniques In Food Processing Sector

Credits: 03

Total No. of Lectures: 45

Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Course learning outcomes:

1. To understand about various emerging technologies in food processing
2. To understand the mechanism of innovative techniques for the improvement of production yield and quality
3. To understand the applications of novel processing techniques in the processing &preservation of foods.
4. To Understand the concepts of High-Pressure Processing and Ultrasound techniques in food processing and microbial deactivation
5. To Understand the application of microwave and radio frequency wave technology in food processing
6. To Understand the membrane technology and Super critical fluid extraction process in food sector
7. To Understand the significance and application of Nanotechnology in food sector

Unit-I

- Concept of minimal processing of fruits and vegetables. Natural preservation systems for foods. Synergistic & Antagonistic effects of food mixtures.
- Introduction, scope and application of High-Pressure Processing (HPP) of foods. Mechanism of microbial inactivation through HPP. Commercial HPP equipment.
- Ultrasonics in Food Processing: Principle, properties, equipment and its applications. Microbial inactivation by ultrasound

Unit-II

- Food Processing by Radio Frequency Electric Fields and its applications: Pulse Electric Field (PFE), Moderate Electric Field (MEF).
- Use of Electromagnetic Radiations in Food Processing: Ohmic heating, IR heating, Microwave heating, Inductive heating.

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VIII (Honours)
(Examination to be held in May 2026, 2027, 2028)
Minor Course (Theory)

Course Code: UMIFST-805

Course Title: Novel Techniques In Food Processing Sector

Credits: 03
Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Total No. of Lectures: 45

Unit-III

- Advances in Membrane Technology and their industrial applications in Food Processing: Microfiltration, Ultrafiltration, Nanofiltration, Reverse Osmosis. Principle and Equipment involved.
- Principle, application, advantages and disadvantages of Super Critical Fluid Extraction (SCFE) process. Types of Super critical fluids and their properties, Methods of Extraction. Applications in Food Processing Sector.

Unit-IV

- Concept and applications of Nanotechnology in Food Processing, its semblance and contribution in food industry along with advantages and limitations.
- Significance of Nano particles, Nano composites, Nano emulsions, Nano structured materials and Nano sensors and their applications in Food Processing Sector
- Novel applications in food analysis: Atomic Absorption Spectroscopy (AAS), Fourier Transform Infrared (FTIR), X-ray Diffraction (XRD), Differential Scanning Calorimetry (DSC), Scanning Electron Microscopy (SEM), e-sensors and biosensors.

References:

1. Desrosier Norman W," The Technology of Food Preservation", Westport, Conn. AVI Pub. Co. (4th Edition) 1977 / 2004
2. Norman N.Potter, Joseph H.Hotchkiss, " Food Science", 5th Edition, CBS Publishers & Distributors Pvt. Ltd. 2007
3. Sivasankar, B.,"Food Processing and Preservation", Prentice Hall of India Pvt.Ltd., New Delhi. 2002
4. P J Fellows, "Food Processing Technology", 3rd Edition. Woodhead Publishing 2009
5. Gould G. W. "New Methods of Food Preservation", Springer U.S 1995

Food Science and Quality Control
Semester VIII (Honours)
(Examination to be held in May 2026, 2027, 2028)
Minor Course (Theory)

Course Code: UMIFST-805

Course Title: Novel Techniques In Food Processing Sector

Credits: 03

Total No. of Lectures: 45

Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

6. Gustavo V. Barbosa-Canovas,Maria S. Tapia,M. Pilar Cano,,"Novel Food Processing Technologies", CRC press 2004

7. Tewari G, Juneja V.K.,"Advances in Thermal and Non-Thermal Food Preservation", Wiley Blackwell Press 2007

8. https://swayam.gov.in/ Category: Engineering & Technology. Sub Category: Agriculture and Food Engineering

Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VIII (Honours)
(Examination to be held in May 2026, 2027, 2028)
Minor Course (Practical)

Course Code: UMIFST-805

Course Title: Novel Techniques In Food Processing Sector

Credits: 01
Maximum Marks: 25

List of Practical:

1. Microwave application in Thermal Food Processing
2. Demonstration of Atomic Absorption Spectroscopy (AAS)/Fourier Transform Infrared (FTIR)/X-ray Diffraction (XRD)/Differential Scanning Calorimetry (DSC)/Scanning Electron Microscopy (SEM)
3. Visit to Instrumentation Laboratory.

Scheme of Examination:

THEORY		
DESCRIPTION	**TIME ALLOTTED**	**MARKS**
Mid Semester Assessment Test shall be conducted by the course coordinator after completion of the syllabus up to 50% and the pattern of the examination shall be decided by the respective Board of Studies	1½ Hours	15
End Semester University Examination shall be conducted for entire syllabus. The break up is as under: **Section A** shall consist Four (4) short answer questions having one question from each unit. The students are required to attempt all questions. Each question shall be of 3 Marks. **Section B** shall consist Eight (8) long answer questions +00having two questions from each unit. The students are required to attempt one question from each unit. Each question shall be of 12 Marks.	3 Hours	60
PRACTICAL/TUTORIAL		
Daily evaluation of practical's/tutorials/Viva voce/Records etc.	10 Marks for Continuous Assessment	
Final Examination **Note: The BOS shall device the mechanism of Final examination.**	15 Marks for Final examination	

Four Year Under Graduate Programme (FYUGP) as per NEP – 2020

Food Science and Quality Control

Semester – VIII (Honours with Research)

(Examination to be held in May 2026, 2027, 2028)

S.No.	Course Type	Course No.	Course Title	Credits (Theory+ Practical)	Marks				Total Marks
					Theory		Practical/ Tutorials		
1	Major	UMJFST-806	Research Methodology	(3 + 1)	Mid Semester 15 Marks	End Exam 60 Marks	Assessment 10 Marks	Exam 15 Marks	75 + 25 = **100**
2	Minor	UMIFST-807	Novel Techniques in Food Processing Sector	(3 + 1)	Mid Semester 15 Marks	End Exam 60 Marks	Assessment 10 Marks	Exam 15 Marks	75 + 25 = **100**
3.	Skill Enhancement	USEFSP-808	Dissertation	12	Internal Assessment 150		External Assessment (Viva) 150		**300**

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Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VIII (Honours with Research)
(Examination to be held in May 2026, 2027, 2028)
Major Course (Theory)

Course Code: UMJFST-806
Credits: 03
Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Course Title: Research Methodology
Total No. of Lectures: 45

Course learning outcomes:

1. Understand different types of research like experimental, survey, applied, action research etc., and differentiate advantages and disadvantages each type of research.
2. Acquire knowledge in developing a research proposal in the appropriate scientific style.
3. Understand different types of searches and can compare the advantages and disadvantages of each type of research
4. Critically know the procedures for identifying an ideal sample for scientific research and able to prepare a research proposal in the appropriate scientific style.

Unit-I

Nature and Purpose of Research:

- Meaning of research, aim, Nature and scope of research, Prerequisites of research, Types of research: Exploratory, Descriptive and Experimental.
- Research Problem: Types of research problems, Characteristics of a good research problem.
- Hypothesis: Meaning and types of hypotheses, Research proposal or synopsis.
- Research Methods: Qualitative and Quantitative

Unit-II

Review of Literature:

- Purpose of the review, Identification of the literature, organizing the literature.
- Data Collection and Analysis: Types of data, Methods of data collection, Sample and Population, Sampling Techniques, Characteristics of a good sample.
- Tools of Data Collection: Observation method, Interview, Questionnaire, various rating scales, Characteristics of good research tools.

development of academic writing skills, including proper citation and referencing, adherence to style guidelines, and organization of content.

Food Science and Quality Control
Semester VIII (Honours with Research)
(Examination to be held in May 2026, 2027, 2028)
Skill Enhancement

Course Code: USEFSP-808 **Course Title:** Dissertation
Credits: 12
Maximum Marks: 300

7. **Feedback and Revision**: Throughout the dissertation process, students shall receive feedback on their work from their advisor, committee members, and peers. The pedagogy encourages students to incorporate constructive criticism, revise their work based on feedback, and refine their research and writing in response to scholarly input.

8. **Project Management**: Completing a dissertation requires effective project management skills, including planning, organization, and time management. The pedagogy emphasizes the development of a research timeline, setting goals and milestones, and adhering to deadlines throughout the dissertation process

9. **Defense and Evaluation**: Students are required to defend their dissertation before a committee of faculty members or experts in the field. The pedagogy prepares students for this process by helping them articulate and defend their research findings, respond to questions or critiques from the committee, and demonstrate the significance of their work.

EXAMINATION/EVALUATION

Students will work on specific project attached to a supervisor and submit a thesis at the end of the semester. The assessment will be based on the midterm evaluation, evaluation of final report and viva-voce examination. They will be required to complete the data collection, analysis and writing of dissertation so as to submit it at the end of Semester and to present it at seminar.

The total allotted marks 100 are divided in the following way

- Internal Assessment: 50% marks
- External Assessment: 50% marks

The students should submit one page of synopsis on the project work for display on the notice board.

The project presentation is for 20 minutes followed by 10 minutes for discussion.

The student should submit a technical write-up on the project.

At least one teacher will be associated with the project seminar to evaluate students for the award of sessional marks which will be on the basis of performance in all the 3 items (synopsis, presentation, technical write-up).

Food Science and Quality Control
Semester VIII (Honours with Research)
(Examination to be held in May 2026, 2027, 2028)
Major Course (Practical)

Course Code: UMJFST-806
Credits: 01
Maximum Marks: 25

Course Title: Research Methodology

List of Practical:

1. Identification of different variables in specialization of study.
2. Framing of hypothesis-Null and alternate Hypothesis
3. Preparation of schedule/questionnaire.
4. Preparation of research proposal
5. Study of an article in a journal-Abstract, Methodology, Results and Bibliography

Scheme of Examination:

THEORY		
DESCRIPTION	**TIME ALLOTTED**	**MARKS**
Mid Semester Assessment Test shall be conducted by the course coordinator after completion of the syllabus up to 50% and the pattern of the examination shall be decided by the respective Board of Studies	1½ Hours	15
End Semester University Examination shall be conducted for entire syllabus. The break up is as under: **Section A** shall consist Four (4) short answer questions having one question from each unit. The students are required to attempt all questions. Each question shall be of 3 Marks. **Section B** shall consist Eight (8) long answer questions having two questions from each unit. The students are required to attempt one question from each unit. Each question shall be of 12 Marks.	3 Hours	60
PRACTICAL/TUTORIAL		
Daily evaluation of practical's/tutorials/Viva voce/Records etc.	10 Marks for Continuous Assessment	
Final Examination **Note: The BOS shall device the mechanism of Final examination.**	15 Marks for Final examination	

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Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VIII (Honours with Research)
(Examination to be held in May 2026, 2027, 2028)
Minor Course (Theory)

Course Code: UMIFST-807

Course Title: Novel Techniques in Food Processing Sector

Credits: 03
Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Total No. of Lectures: 45

Course learning outcomes:

1. To understand about various emerging technologies in food processing
2. To understand the mechanism of innovative techniques for the improvement of production yield and quality
3. To understand the applications of novel processing techniques in the processing &preservation of foods.
4. To Understand the concepts of High-Pressure Processing and Ultrasound techniques in food processing and microbial deactivation
5. To Understand the application of microwave and radio frequency wave technology in food processing
6. To Understand the membrane technology and Super critical fluid extraction process in food sector
7. To Understand the significance and application of Nanotechnology in food sector

Unit-I

- Concept of minimal processing of fruits and vegetables. Natural preservation systems for foods.
- Introduction, scope and application of High-Pressure Processing (HPP) of foods. Mechanism of microbial inactivation through HPP.
- Ultrasonics in Food Processing: Principle, properties, and its applications. Microbial inactivation by ultrasound

Unit-II

- Food Processing by Radio Frequency Electric Fields and its applications: Pulse Electric Field (PFE), Moderate Electric Field (MEF).
- Use of Electromagnetic Radiations in Food Processing: Ohmic heating, IR heating, Microwave heating, Inductive heating.

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Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VIII (Honours with Research)
(Examination to be held in May 2026, 2027, 2028)
Minor Course (Theory)

Course Code: UMIFST-807

Course Title: Novel Techniques in Food Processing Sector

Credits: 03
Maximum Marks: 100
Theory= 75
Practical/Tutorial= 25

Total No. of Lectures: 45

Unit-III

- Advances in Membrane Technology and their applications in Food Processing: Microfiltration, Ultrafiltration, Nanofiltration, Reverse Osmosis.
- Principle, application, advantages and disadvantages of Super Critical Fluid Extraction (SCFE) process. Types of Super critical fluids and their properties. Applications in Food Processing Sector.

Unit-IV

- Concept and applications of Nanotechnology in Food Processing, with advantages and limitations.
- Significance of Nano particles, Nano composites, Nano emulsions.
- Novel applications in food analysis: Atomic Absorption Spectroscopy (AAS), Fourier Transform Infrared (FTIR), X-ray Diffraction (XRD), Differential Scanning Calorimetry (DSC), Scanning Electron Microscopy (SEM), e-sensors and biosensors.

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2. Norman N.Potter, Joseph H.Hotchkiss, " Food Science", 5th Edition, CBS Publishers & Distributors Pvt. Ltd. 2007

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Semester VIII (Honours with Research)
(Examination to be held in May 2026, 2027, 2028)
Minor Course (Theory)

Course Code: UMIFST-807

Course Title: Novel Techniques in Food Processing Sector

Total No. of Lectures: 45

Credits: 03
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Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VIII (Honours with Research)
(Examination to be held in December 2026, 2027, 2028)
Minor Course (Practical)

Course Code: UMIFST-807

Course Title: Novel Techniques In Food Processing Sector

Credits: 01
Maximum Marks: 25

List of Practical:

1. Microwave application in Thermal Food Processing
2. Demonstration of Atomic Absorption Spectroscopy (AAS)/Fourier Transform Infrared (FTIR)/X-ray Diffraction (XRD)/Differential Scanning Calorimetry (DSC)/Scanning Electron Microscopy (SEM)
3. Visit to Instrumentation Laboratory.

Scheme of Examination:

THEORY		
DESCRIPTION	**TIME ALLOTTED**	**MARKS**
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PRACTICAL/TUTORIAL		
Daily evaluation of practical's/tutorials/Viva voce/Records etc.	10 Marks for Continuous Assessment	
Final Examination **Note: The BOS shall device the mechanism of Final examination.**	15 Marks for Final Examination	

development of academic writing skills, including proper citation and referencing, adherence to style guidelines, and organization of content.

Food Science and Quality Control
Semester VIII (Honours with Research)
(Examination to be held in May 2026, 2027, 2028)
Skill Enhancement

Course Code: USEFSP-808 **Course Title:** Dissertation
Credits: 12
Maximum Marks: 300

7. **Feedback and Revision**: Throughout the dissertation process, students shall receive feedback on their work from their advisor, committee members, and peers. The pedagogy encourages students to incorporate constructive criticism, revise their work based on feedback, and refine their research and writing in response to scholarly input.

8. **Project Management**: Completing a dissertation requires effective project management skills, including planning, organization, and time management. The pedagogy emphasizes the development of a research timeline, setting goals and milestones, and adhering to deadlines throughout the dissertation process

9. **Defense and Evaluation**: Students are required to defend their dissertation before a committee of faculty members or experts in the field. The pedagogy prepares students for this process by helping them articulate and defend their research findings, respond to questions or critiques from the committee, and demonstrate the significance of their work.

EXAMINATION/EVALUATION

Students will work on specific project attached to a supervisor and submit a thesis at the end of the semester. The assessment will be based on the midterm evaluation, evaluation of final report and viva-voce examination. They will be required to complete the data collection, analysis and writing of dissertation so as to submit it at the end of Semester and to present it at seminar.

The total allotted marks 100 are divided in the following way

- Internal Assessment: 50% marks
- External Assessment: 50% marks

The students should submit one page of synopsis on the project work for display on the notice board.

The project presentation is for 20 minutes followed by 10 minutes for discussion.

The student should submit a technical write-up on the project.

At least one teacher will be associated with the project seminar to evaluate students for the award of sessional marks which will be on the basis of performance in all the 3 items (synopsis, presentation, technical write-up).

Food Science and Quality Control
Semester VIII (Honours with Research)
(Examination to be held in May 2026, 2027, 2028)
Skill Enhancement

Course Code: USEFSP-808 **Course Title:** Dissertation
Credits: 12
Maximum Marks: 300

9. **Publication Potential**: Students will learn to produce research that is of publishable quality and has the potential to contribute to the broader academic discourse in their field.

10. **Career Advancement**: Completing a dissertation is a significant milestone in a student's academic journey and can enhance their credentials for future career opportunities. A well-executed dissertation can open doors to employment in academia, research institutions, government agencies, or industry, as well as provide a foundation for further study at the doctoral level.

PEDAGOGY:

The pedagogy, or the method and practice of teaching, for a dissertation typically involves a combination of guidance, mentorship, and independent research. While the dissertation process is largely self-directed, followings are several key components to the pedagogy of a dissertation:

1. **Advisor/Supervisor Support**: Students will work closely with a faculty advisor or supervisor who provides guidance and mentorship throughout the dissertation process. The advisor will help students develop a research topic, refine research questions, plan the research design, and navigate the various stages of the dissertation.

2. **Research Skills Development**: The pedagogy of a dissertation focuses on developing students' research skills, including literature review, research design, data collection methods, data analysis, and interpretation of results. Students are encouraged to engage critically with existing literature, identify gaps or limitations in previous research, and formulate research questions or hypotheses that address these gaps.

3. **Independent Inquiry**: A key aspect of the pedagogy of a dissertation is fostering students' ability to conduct independent inquiry and scholarly research. Students are expected to take ownership of their research project, demonstrate intellectual autonomy, and make decisions about the direction and scope of their study.

4. **Literature Review**: Students shall conduct a comprehensive review of existing literature relevant to their research topic. The pedagogy emphasizes the importance of critically evaluating scholarly sources, synthesizing key concepts and findings, and identifying theoretical frameworks or conceptual models that inform the research.

5. **Methodological Rigor**: The pedagogy of a dissertation shall emphasize methodological rigor in the design, execution, and analysis of research. Students will be encouraged to select appropriate research methodologies, data collection techniques, and analytical tools that align with their research objectives and research questions.

6. **Writing and Communication Skills**: Students are expected to communicate their research findings, methodology, and theoretical concepts in a clear, coherent, and scholarly manner. The pedagogy emphasizes the

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Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

Food Science and Quality Control
Semester VIII (Honours with Research)
(Examination to be held in May 2026, 2027, 2028)
Skill Enhancement

Course Code: USEFSP-808
Credits: 12
Maximum Marks: 300

Course Title: Dissertation

OBJECTIVES:

Following are outcomes that students aim to achieve through their dissertation work

1. **Contribution to Knowledge**: To make an original contribution to the existing body of knowledge in the field. This could involve conducting novel research, generating new insights, or proposing innovative theories or frameworks.

2. **Research Skills Development**: To develop and refining research skills, including literature review, research design, data collection methods, data analysis, and interpretation of results. Students would demonstrate competence in these research skills through their dissertation work.

3. **Critical Thinking and Analysis**: To critically evaluate existing literature, identify gaps or limitations in previous research, and formulate research questions or hypotheses that address these gaps. Students should be able to demonstrate the ability to analyze complex issues, synthesize information, and draw reasoned conclusions based on evidence.

4. **Methodological Competence**: To demonstrate proficiency in research methodologies relevant to their field of study. This will include qualitative, quantitative, or mixed methods approaches, as well as specific techniques or tools for data collection and analysis.

5. **Writing and Communication Skills**: To effectively communicate research findings, methodology, and theoretical concepts in a clear, coherent, and scholarly manner. A student would demonstrate proficiency in academic writing conventions, including proper citation and referencing, adherence to style guidelines, and organization of content.

6. **Project Management**: To learn effective project management skills, including planning, organization, and time management. Students should demonstrate the ability to develop and adhere to a research timeline, set goals and milestones, and adapt to unforeseen challenges or setbacks.

7. **Independence and Initiative:** To take initiative, work independently, and demonstrate intellectual autonomy. Students would learn evidence of self-motivation, initiative in problem-solving, and the ability to work with minimal supervision.

8. **Presentation and Defense**: To learn to defend their dissertation before a committee of faculty members or experts in the field. This involves presenting their research findings, responding to questions or critiques from the committee, and articulating the significance of their work in a public forum.

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Syllabi of Food Science and Quality Control for FYUGP as per NEP-2020

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