

UNIVERSITY OF JAMMU

SYLLABI AND COURSES OF STUDY FOR FOOD SCIENCE AND QUALITY CONTROL SEMESTER III FOR THE EXAMINATION TO BE HELD IN THE YEARS 2017, 2018 AND 2019

Course Code	Subject	Maximum Marks			Credits	Duration Of Examination
		University Examination	Internal Assessment			
UFSTC301	Post Harvest Technology	80	20	4	2.30hrs	
UFSPC302	Practical	25	25	2	3hrs	
UFSTS303	Technology of Processing Fruits and Vegetables (Theory & Practical)(SEC)	80	20	4	6 hrs	

SYLLABI AND COURSES OF STUDY FOR FOOD SCIENCE AND QUALITY CONTROL SEMESTER IV FOR THE EXAMINATION TO BE HELD IN THE YEARS 2018, 2019 AND 2020

Course Code	Subject	Maximum Marks			Credits	Duration Of Examination
		University Examination	Internal Assessment			
UFSTC401	Sensory Evaluation and Food Packaging	80	20	4	2.30hrs	
UFSPC402	Practical	25	25	2	3hrs	
UFSPS403	Basic Bakery Technology and Entrepreneurship (Practical)(SEC)	80	20	4	6 hrs	

B.Sc. Semester III
(Food Science and Quality Control)
Core Course

Course code: UFSTC301

Duration of Examination: 2.30hrs

Post Harvest Technology

Max marks = 100

External Assessment =80

Internal Assessment = 20

Syllabus for Examination to be held in the year 2017, 2018 & 2019

Recommended credits: 4(4hrs. per week)

Objective:

1. *To understand the procedures used for food processing.*
2. *To study the structure, composition, nutritional quality and post harvest changes of various plant foods.*
3. *To study the basic processing technologies used for various foods.*

UNIT I

- Food situation in India and outside. Trapping the unconventional post-harvest losses and prospects for food processing for export.
- Traditional foods – status and need for revival in the context of non-traditional foods, urbanization and other factors.
- Product development – Primary processing, secondary processing, types of products, e.g. Quick cooking, Fast foods, Fabricated foods, Convenience foods

UNIT II

- Physical Principles underlying food processing and preservation including thermal processing, ionizing, radiations, refrigeration, freezing and dehydration.
- Physical and Chemical changes in food that affect texture, flavor, odour, stability and nutritive value during processing and storage.
- Basic processing technology of cereals and legumes, losses during storage, handling and processing. Basic processing technology of oilseeds

UNIT III

- Basic processing technology of fruits and vegetables.
- Basic processing technology of milk and milk products.
- Basic processing technology of Meat, Fish, Poultry and eggs.
- Fermentation Technology, Enrichment and fortification technology.
- High protein technology (Single Cell Protein)

UNIT IV

- Quality control in food industry-Methods of evaluation and quality control of various aspects in quality of raw material, manufacturing processes and finished goods.
- Waste disposal and sanitation
- Extruded foods
- Food Irradiation

UNIT V

- Additives and Preservatives used in processing and Formulation,
- Food Adulteration
- Chemical and physical properties of foods.
- Transportation, Types/Mode, optimization of transportation taking into account type of product, distance, storage, facilities etc.

NOTE FOR PAPER SETTING: THEORY EXAMINATION Total time 2 ½ hours only

❖ **The external examinations in theory shall consist of the following**

1. Five (5) short answers to the questions representing all units/syllabi i.e. at least one from each unit (without detailed explanation having 70 to 80 words, to be completed in approximately 6 minutes) and having 3 marks for each answer . **(All Compulsory) (3x5=15)**
2. Five (5) medium answers to the questions representing all units/syllabi i.e. at least one from each unit (with explanation having 250-300 words, to be completed in approximately 12 minutes) and having 7 marks for each answer **(All Compulsory) (7x5=35)**
3. Five (5) long answers to the questions representing whole of the syllabi (with detailed analysis/explanation/critical evaluation/solution to the stated problems ,within 500-300 words, to be completed in approximately 30 minutes) and having 15 marks each answer. **(Any two to be attempted) (15x2=30)**

Distribution of Internal assessment (20 marks)

Theory	Syllabus to be covered in the examination	Time allotted	% weightage (marks)
Internal Assessment Test One long answer type question of 10 marks and five short answer type question of 2 marks each)	Upto 50 % (after 45 days)	1 hour	20

REFERENCES:

1. Kent, N.L. 2003. Technology of Cereal, 5th Ed. Pergamon Press.
2. Chakraverty. 1988. Post Harvest Technology of Cereals, Pulses and Oilseeds, revised Ed., Oxford & IBH Publishing Co. Pvt Ltd.
3. Marshall, Rice Science and Technology. 1994. Wadsworth Ed., Marcel Dekker, New York.
4. Manay, S. and Sharaswamy, M. 1987. Food Facts and Principles. Wiley Eastern **Limited**
5. Girdharilal, Siddappaa, G.S and Tandon, G.L., 1998, Preservation of fruits& Vegetables, ICAR, New Delhi

6. W B Crusses.2007,Commercial Unit and Vegetable Products, W.V. Special Indian
7. Edition, Pub: Agrobios India
8. Manay, S. 2004, & Shadaksharaswami, M., Foods: Facts and Principles, New Age Publishers,
9. Srilakshmi ,B.(2007). Food Science, 4th Edition. New Age International Ltd.
10. De Sukumar, . 2007, Outlines of Dairy Technology, Oxford University Press, Oxford.
11. .Lawrie R A, 1998,Lawrie's Meat Science, 5th Ed, Woodhead Publisher, England,
12. Shai Barbut, 2005.,Poultry Products Processing,CRC Press 2005.
13. Stadelman WJ, Owen J Cotterill, 2002, Egg Science and Technology, 4th Ed. CBS Publication New Delhi
14. Hall GM, 1992,Fish Processing Technology, VCH Publishers Inc., NY, 1992
15. Food Science and Preservation – G. Subbulakshmi
16. Introductory Foods – Marion Bennion

PRATICALS

Maximum Marks: 50

Internal Assessment: 25

External Assessment: 25

Course code:UFSPC302

Credits: 2 (3 hours/ week)

1. Preservation of fruits and vegetables by following methods
 - a. Canning
 - b. Squash/Jam/Nectar
 - c. Pickles
 - d. Drying
2. To visit any two food processing Units to understand the quality control methods used while processing food.
3. Simple physical and chemical tests to determine quality and detect adulterants in the followings:
 - i. Oil and Fats
 - ii. Spices and Condiments (any five)
 - iii. Food Grains, Pulses and Oilseeds
 - iv. Flours – Wheat
 - v. Canned foods – Drained wt.
 - vi. Sugar and Honey
 - vii. Milk & Milk products
 - viii. Tea, Coffee

Note for practical examination (Total marks: 50)

Practical	Syllabus to be covered in examination	Weightage (Marks)
Daily evaluation of practical records/ viva voce/ attendance etc		25 (including 20% for attendance, 40% for viva voce + test and 40%

		for day to day performance)
Final practical performance + viva voce (external examination)	100% syllabus	25 (40% paper + 10% viva voce)
Total		50

**B.Sc. Semester III
(Food Science and Quality Control)
Skill Enhancement Course**

Course code: UFSTS 303

**TECHNOLOGY OF PROCESSING OF FRUITS & VEGETABLES
(Theory and Practical)**

Duration of Examination: 2.30hrs

Max marks = 100

External Assessment = 80

Internal Assessment = 20

Syllabus for Examination to be held in the year 2017, 2018 & 2019

Recommended credits: 4(6 hrs. per week)

Objectives:

1. To understand the history and evolution of food processing.
2. To study the importance, nutritional quality and post harvest changes of various fruits and vegetables.
3. To introduce the basics of processing and preservation technologies fruits and vegetables.
4. To know the laws related to preservation of fruits and vegetables.

.Unit-I

- History, evolution and need of preservation.
- Importance of fruits and vegetable, Nutritive quality of fruits and vegetables, role of fruits and vegetables in the diet.
- Reasons of spoilage of fruits and vegetables
- Chemical changes in fruits and vegetables.

Unit-II

- Technology of post harvest handling.
- Principles and methods of fruits and vegetables preservation (short & long), low temperature preservation, high temperature preservation, Dehydration(Sun drying & mechanical dehydration, process variation for fruits and vegetables, packing and storage) , irradiation.
- Composition and related quality factors for processing.

Unit-III

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

Unit-IV

- Introduction to jams: Constituents, selection of fruits, processing and technology.

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

Unit V

- Vinegar: General methods of preparation and uses.
- Canning of fruits and vegetables: Selection of fruits and vegetables, process of canning, factors affecting the process- time and temperature, containers of packing, lacquering, syrups and brines for canning, spoilage in canned foods.
- Utilization of wastes from fruits and vegetables industry.
- Laws and standards relevant to fruit & vegetable processing and preservation.

REFERENCES

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

Note for practical examination (Total marks: 100)

Practical	Syllabus to be covered in examination	Weightage (Marks)
Daily evaluation of practical records/ viva voce/ attendance etc		50 (including 20% for attendance, 40% for viva voce + test and 40% for day to day performance)
Final practical performance + viva voce (external examination)	100% syllabus	50 (40% paper + 10% viva voce)
Total		100

B.Sc. Semester IV
(Food Science and Quality Control)
CORE COURSE

Course code: UFSTC401

Sensory Evaluation and Food Packaging

Duration of Examination: 2.30hrs

Max marks =100

Recommended credits: 4 (2hrs. per week)

External Assessment =80

Internal Assessment = 20

Syllabus for Examination to be held in the year 2018, 2019 & 2020

Objectives:

1. To understand the processes involved in sensory evaluation of food, for maintaining quality
2. To make the students aware of role of the sensory organs in evaluation of foods
3. To know the various methods and materials used for food packaging
4. To make the students understand legal and safety issues related to food packaging

UNIT I

- Introduction to quality attributes of food Appearance, flavour, textural factors and additional quality factors.
- Gustation: Introduction and importance of gustation. Structure and physiology of taste organs- tongue, papillae, taste buds, salivary glands.
- Mechanism of taste perception Chemical dimensions of basic tastes- sweet, salt, sour, bitter.
- Factors affecting taste quality, reaction time, taste modification, absolute and recognition threshold, Taste abnormalities

UNIT 2.

- Olfaction :Introduction, definition and importance of odour and flavor, physiology of odour perception
- Mechanism of odour perception, chemical specificity of odour. Odour measurement techniques – historical perspective and emphasis on recent techniques- e- nose etc. Olfactory abnormalities.
- Colour: Introduction and importance of colour, Dimensions of colour and attributes of colour; gloss etc. Perception of colour.
- Colour Measurement: Munsell colour system, CIE colour system, Hunter colour system, Colour abnormalities

UNIT 3

- Texture :Introduction, definition and importance of texture. Texture perception, receptors involved in texture perception, Rheology of foods Texture classification, Texture measurement – basic rheological models, forces involved in texture measurement and recent advances in texture evaluation.
- Sensory Evaluation Methods: Threshold test, Difference Test, Ranking Test, Scoring Test, Hedonic Scale

- Consideration for testing sensory evaluation: Testing area, Testing setup, Lighting setup, Testing schedule
- Preparation of Samples, Coding and order of presentation, types of panels-trained and consumer panels, semi-trained

UNIT IV

- Introduction to Food Packaging, Packaging Functions and Requirements, Food Packaging Materials, Paper and paper-based materials, corrugated fiber board (CFB).
- Plastics as food packaging materials. Environmental Concerns- recycling and disposal of plastic waste.
- Metals as packaging materials,
- Glass: Composition, Properties, Package Designing for different Foods, Package design for moisture and oxygen sensitive foods,

UNIT V

- Food Packaging Laws and Regulations.
- Testing Procedures for Packaging Materials- thickness, tensile strength, puncture resistance, bursting strength, seal strength, water vapor permeability, Gas permeability, grease resistance
- Testing Procedures for Packaged Foods - Compatibility and shelf life studies, Active and Intelligent packaging systems

NOTE FOR PAPER SETTING: THEORY EXAMINATION Total time 2 ½ hours only

❖ ***The external examinations in theory shall consist of the following***

4. Five (5) short answers to the questions representing all units/syllabi i.e. at least one from each unit (without detailed explanation having 70 to 80 words, to be completed in approximately 6 minutes) and having 3 marks for each answer . **(All Compulsory) (3x5=15)**
5. Five (5) medium answers to the questions representing all units/syllabi i.e. at least one from each unit (with explanation having 250-300 words, to be completed in approximately 12 minutes) and having 7 marks for each answer **(All Compulsory) (7x5=35)**
6. Five (5) along answers to the questions representing whole of the syllabi (with detailed analysis/explanation/critical evaluation/solution to the stated problems ,within 500-300 words, to be completed in approximately 30 minutes) and having 15 marks each answer. **(Any two to be attempted) (15x2=30)**

Distribution of Internal assessment (20 marks)

Theory	Syllabus to be covered in the examination	Time allotted	% weightage (marks)
Internal Assessment Test One long answer type question of 10 marks and five short answer type question of 2 marks each)	Upto 50 % (after 45 days)	1 hour	20

Recommended Readings:

- Robertson GL, Food Packaging – Principles and Practice, CRC Press Taylor and Francis Group, 2012
- Paine FA and Paine HY, A Handbook of Food Packaging, Blackie Academic and Professional, 1992
- Coles R, McDowell D, Kirwan MJ Food Packaging Technology. Blackwell, 2003
- Meilgard (1999). Sensory Evaluation Techniques, 3rded. CRC Press LLC, 1999.
- Amerine, Pangborn & Roessler (1965). Principles of Sensory Evaluation of food, Academic Press, London.

PRATICALS**Course code:UFSPC402****Credits: 2 (3 hours/ week)****Maximum Marks: 50****Internal Assessment: 25****External Assessment: 25**

1. To Carry out threshold test for any two basic tastes
2. To carry out sensory evaluation by Hedonic Scale
3. To carry out sensory evaluation by Scoring method
4. Identification of various types of plastic materials used for packaging
5. To find out the GSM of paper/paperboard
6. Packaged food cut-out analysis
7. To visit any packaging material manufacturing unit to understand the process and safety measures.

Note for practical examination (Total marks: 50)

Practical	Syllabus to be covered in examination	Weightage (Marks)
Daily evaluation of practical records/ viva voce/ attendance etc		25 (including 20% for attendance, 40% for viva voce + test and 40% for day to day performance)
Final practical performance + viva voce (external examination)	100% syllabus	25 (40% paper + 10% viva voce)
Total		50

B.Sc. Semester IV
(Food Science and Quality Control)
SKILL ENHANCEMENT COURSE

Course code: UFSPS403

BASIC BAKERY TECHNOLOGY AND ENTREPRENEURSHIP
(PRACTICAL)

Duration of Examination: 2.30hrs
 Recommended credits: 4 (6 hrs. per week)

Max marks =100

External Assessment =80
 Internal Assessment = 20

Syllabus for Examination to be held in the year 2018, 2019 & 2020

Objectives:

1. *To develop in students awareness and skills related to entrepreneurship in Baking.*
2. *To introduce basic baking techniques- Indian and Non Indian*
3. *To give them hands on training to enable them to set up their own Baking Units*
4. *To give them concept of Modification of bakery products to make them nutritious and applicable for persons with different requirements*

Unit-I

- History of Bakery, Current status, economic importance of Bakery Industry in India.
- Product types, nutritional quality and safety of products, pertinent standards & regulations. Present Trends - Prospects of Bakery
- Nutrition facts of Bakery.
- Raw materials used in Bakery - Wheat: Structure and Composition of wheat, Varieties of Wheat, Wheat products - Whole wheat flour, Maida, semolina, Role of Gluten

Unit-II

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

Unit-III

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

Unit-IV

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

Unit-V

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

REFERENCES

1. Dubey, S.C. (2007). Basic Baking 5th Ed. Chanakya Mudrak Pvt. Ltd.
2. Raina et.al. (2003). Basic Food Preparation-A complete Manual. 3rd Ed. Orient Longman Pvt. Ltd.
3. Manay, S. & Shadaksharaswami, M. (2004). Foods: Facts and Principles, New Age Publishers.
4. Barndt R. L. (1993). Fat & Calorie – Modified Bakery Products, Springer US.
5. Samuel A. Matz (1999). Bakery Technology and Engineering, PAN-TECH International Incorporated.
6. Faridi Faubion (1997). Dough Rheology and Baked Product Texture, CBS Publications.
8. Samuel A. Matz (1992). Cookies & Cracker Technology, Van Nostrand Reinhold

Note for practical examination (Total marks: 100)

Practical	Syllabus to be covered in examination	Weightage (Marks)
Daily evaluation of practical records/ viva voce/ attendance etc		50(including 20% for attendance, 40% for viva voce + test and 40% for day to day performance)
Final practical performance + viva voce (external examination)	100% syllabus	50 (40% paper + 10% viva voce)
Total		100