Programme Structure for B. Sc. Food Science and Technology

(minor in Medical Laboratory Technology)

Semester III: Teaching Scheme

Course code	Course name	Teaching scheme (Hrs /week)			Credits assigned			Total credits
		Th	Pr	Tu	Th	Pr	Tu	
U25PC301	Food Analysis	3	-	-	3	-	-	3
U25PC302	Milk and Milk Products	2	-	-	2	-	-	2
U25PC303	Human Nutrition	2	-	-	2	-	-	2
UXXMM0XX	Multidisciplinary Minor-II	3	-	-	3	-	-	3
UXXOE03X	Open Elective-III	2	-	-	2	-	-	2
U03AE003 OR U03AE004 OR U03AE005	Modern Indian Language: Hindi OR Modern Indian Language: Sanskrit OR Modern Indian Language: Marathi	2	-	-	2	-	-	2
U25PC304	Food Analysis Lab	-	2	-	-	1	-	1
U25SE303	Milk and Milk Products Lab	-	4	-	-	2	-	2
UXXMM0XX	Multidisciplinary Minor-II Lab	-	2	-	-	1	-	1
U25FP301	Field Project	-	4	-	-	2	-	2
U04CC0XX	Co-curricular courses III	-	4	-	-	2	-	2
	Total	**14**	**16**	**-**	**14**	**08**	**-**	**22**

DETAILED SYLLABUS OF SEMESTER: III

Theory Course

Course code	Course name	Teaching Scheme (Hr/week)			Credits Assigned		
		Theory	Practical	Tutorial	Theory	Practical	Tutorial
U25PC301	Food Analysis	03	-	-	03	-	-

Evaluation Scheme

Course Code	Course Name	Evaluation Scheme (In Semester)					End Semester Exam (ESE)		
		T1	T2	FET	Total	Min pass	Marks	Min pass	Total (Marks)
U25PC301	Food Analysis	10	10	5	25	40%	50	40%	75

Course Description:

This course will focus on and explore the ideas from view point of knowing and understanding the basic of food, imparting knowledge about the analysis of food, basic components of food. It will also focus on learning the about the basic concepts of various methods that take place in food industry for food analysis.

Course Objectives:

1. To understand the basic principles of food analysis.
2. To study the proximate analysis of food.
3. To application various equipment in food analysis.

Course Outcomes: after the end of this course students will able to

CO1 Explain[2]Proximate analysis of food.

CO2 Indentify[2]Different component of food.

CO3 Analyze[3]quantitative and qualitative test of food.

CO4 Evalute[4]various component of food.

Course Contents

Module	Unit	Description	Hours
1.0		**Types of Solution**	
1	1.1	Types of Solution: Molar Solution, Normal solution, Colloidal solutions,	9
	1.2	Buffer solutions, Percent solution, Measurement of pH, Sampling method	
2.0		**Proximate Analysis of Food**	
2	2.1	Proximate Analysis of Food: Introduction, Methods for estimation of moisture, protein	9
	2.2	Proximate Analysis of Food: , fat, fiber, ash and carbohydrate.	
3.0		**Calorimetry and spectrophotometry**	
3	3.1	Introduction Beer's- Lambert's law, Construction, Working, Principle, Care of colorimeter	9
	3.2	Application of calorimetry and spectrophotometry, Standard solutions, Blank solutions. Atomic absorption spectroscopy Introduction, Principles, working, Application	
4.0		**Electrophoresis & Flame photometer**	
4	4.1	Introduction, Principle, Types of electrophoresis, Moving boundary electrophoresis, Zone electrophoresis, Isoelectric focusing, Factors affecting electrophoresis, Applications	9
	4.2	Flame photometer Introduction, Principle, Construction, Working, Applications Fluorimetry Introduction, Principle, Working, Applications	
5.0		**Chromatographic Techniques**	
5	5.1	Introduction, Principle, Partition chromatography, Adsorption chromatography, Gel chromatography, Ion exchange chromatography	9
	5.2	Affinity chromatography, Paper chromatography, Column chromatography, HPLC	

Text Books

1 Morris B. Jacobs, The chemical analysis of foods and food products.

2 S. Ranganna, Hand book of analysis and quality control for fruit and vegetable products.

References

1 D. T. Plummer, An introduction to practical biochemistry.

2 Pomeranz, Y., Meloan, Food Analysis: Theory and practice

U25PC302 Milk and Milk Product Technology

Theory Course

Course code	Course name	Teaching Scheme (Hr/week)			Credits Assigned		
		Theory	Practical	Tutorial	Theory	Practical	Tutorial
U25PC302	Milk and Milk Product Technology	03	-	-	03	-	-

Evaluation Scheme

Course Code	Course Name	Evaluation Scheme (In Semester)					End Semester Exam (ESE)		
		T1	T2	FET	Total	Min pass	Marks	Min pass	Total (Marks)
U25PC302	Milk and Milk Product Technology	10	10	5	25	40%	50	40%	75

Course Description:

This course will focus on and explore the ideas from viewpoint of knowing and understanding the basics of milk and milk product, imparting knowledge about the processing of milk, basic components of milk and milk product, spoilage, packaging of milk and milk product

Course Objectives:

1. To understand the basic of milk and milk product.
2. To study the different constituents of milk and milk product .
3. To application of milk in processed foods.

Course Outcomes: after the end of this course students will able to

CO1 Explain[2]Scope and status of dairy industry.

CO2 Identify[2] Different component of milk.

CO3 Application [3]of different methods for processing of milk.

CO4 Evalute[2]Different sanitization process.

Course Contents

Module	Unit	Description	Hours
1.0		**Introduction of dairy**	
1	1.1	Introduction of dairy industry in India. Scope of dairy industry and present status.	9
	1.2	Dairy layout for small scale industry and Equipments in the dairy industry.	
2.0		**Dairy plant sanitization**	
2	2.1	Dairy plant sanitization: Basic principles, cleaning in place, types and design of CIP System, agents and methods: bottle and can washing.	9
	2.2	Rotary type and straight through type, cleaning of tankers and silos, Energy use in Dairy plant - sources and cost of energy, control of energy losses and Energy conservation	
3.0		**Composition of milk**	
3	3.1	Composition of milk, Physicochemical properties of milk, Factors affecting Composition of milk.	9
	3.2	Buying, receiving, collection, Transportation of milk, storage and distribution of milk, processing of milk, filtration, clarification, cream separation and heat treatment of milk.	
4.0		**Milk processing I**	
4	4.1	Types of milk products. Milk product Processing: Cream, Butter, Khoa, Paneer, Ice-cream	9
	4.2	Condensed milk and Evaporated milk. Judging and grading of milk and its products	
5.0		**Milk processing II**	
5	5.1	Processing of Fermented products: Yoghurt, Curd, acidophilus milk, buttermilk, and Cheddar cheese, Introduction, Manufacturing process, packaging, storage	9
	5.2	Defects and their prevention Processing of cheese: Introduction, Types, processing, packaging, storage, defects and their prevention WMP and SMP.	

Text Books

1 De Sukumar - Outlines of Dairy Technology. Oxford Univ. Press. New Delhi.

2 Robinson R. K. - Modern Dairy Technology. Elsevier Applied Science UK

References

1 Warner J. M. - Principles of Dairy Processing. Wiley Eastern Ltd. New Delhi.

2 Yarpar W. J. and Hall C. W. - Dairy Technology and Engineering. AVI Westport.

3 Rosenmal I. - Milk and Milk Products. VCH. New York

- Internal Assessment (T1, T2 and FET):
  - T1 should be based on first two modules and T2 should be based on next two modules, for 10 marks each.
  - Fifth module will be assessed for 5 marks separately.
- End Semester Examination:
  - Question paper will comprise of 5 questions, each carrying 10 marks.
  - The duration of end semester examination shall be 2 hours.
  - The students need to solve all 5 questions.
  - Question No.1 will be compulsory and based on entire syllabus.
  - Remaining question (Q.2 to Q.5) will be selected from all the modules.

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U25PC303 Human Nutrition

Theory Course

Course code	Course name	Teaching Scheme (Hr/week)			Credits Assigned		
		Theory	Practical	Tutorial	Theory	Practical	Tutorial
U25PC303	Human Nutrition	02	-	-	02	-	-

Evaluation Scheme

Course Code	Course Name	Evaluation Scheme (In Semester)					End Semester Exam (ESE)		
		T1	T2	FET	Total	Min pass	Marks	Min pass	Total (Marks)
U25PC303	Human Nutrition	10	--	5	15	40%	35	40%	50

Course Description:

This course will focus on and explore the ideas from viewpoint of knowing and understanding the basics of food nutrition, imparting knowledge about the balanced diet, sources and basic nutrients of food, classification and their uses. It will also focus on learning the about the importance of energy in nutrition of its metabolism in human body.

Course Outcomes: after the end of this course students will able to

CO1 Explain[2]The Basics of nutrition in relation to human health

CO2 Identify[2] Various sources of nutrients and their function in diet

CO3 Examine[3]Importance of energy in nutrition

CO4 Analyze[2]Concept of Balanced Diet

Course Contents

Module	Unit	Description	Hours
1.0		**Introduction to Nutrition**	
1	1.1	Introduction to Nutrition: Definition, Status and signs of Nutrition,Malnutrition, Understanding relationship between food	6
	1.2	Nutrition and health. Functions of food-physiological, psychological and social aspects	
2.0		**Balanced diet**	
2	2.1	Concept of balanced diet, fat requirements: food sources, dietary lipids	6
	2.2	Dietary lipids and their relation to the causation of Atherosclerosis and Ischemic heart disease	
3.0		**Nutrients**	
3	3.1	Nutrients: Classification, Functions, Dietary sources, daily requirements and effects of deficiency of nutrients	6
	3.2	Macro-nutrients- Carbohydrates, proteins, fats, micro-nutrients, Vitamins Types of vitamins and minerals, RDA.	
4.0		**Importance of energy in Nutrition**	
4	4.1	Importance of energy in Nutrition: Energy value of food, daily BMR activities, calculation of BMR, biological value of food	6
	4.2	Factors affecting BMR. FAO and ICMR Committee for percent calories supplied by carbohydrates, fats and proteins. Energy requirements for different agegroups.	
5.0		**Menu planning**	
5	5.1	Menu planning for balanced meal, effect of cooking and processing of food on nutritional value	6
	5.2	Inter-relationship between vitaminsand nutrients, Diet chart.	

Text Books

1 Dr. M. Swaminathan (2006), Food Science and Nutrition II Edition, Sunetra Roday, Oxford publication Advanced text book on Food and Nutrition, Vol.I and II, Second Edition. BAPPCO Publication

2 Jim Mann and A. Stewart Truswell (2010), Essentials of Human Nutrition, Third Edition:, Oxford publication

Reference Books

1 Potter.(2007) Food Science CBS Publishers & Distributors,5th Edition.

2 Srilakshmi, B, Nutrition Science, New age international (P) Ltd publishers, NewDelhi, 2006

3 Joshi, S. A Nutrition and dietetics. Third edition, Tata McGraw Hill education pvt ltd,New Delhi, 2010

- Internal Assessment (T1 and FET):
  - T1 should be based on first two modules for 10 marks each.
  - Fifth module will be assessed for 5 marks separately it will be taken as seminar.
- End Semester Examination:
  - Question paper will comprise of 5 questions, each carrying 7 marks.
  - The duration of end semester examination shall be 2 hours.
  - The students need to solve all 5 questions.
  - Question No.1 will be compulsory and based on entire syllabus.
  - Remaining question (Q.2 to Q.5) will be selected from all the modules.

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U25PC304 Food Analysis Lab without POE

Course code	Course name	Teaching Scheme (Hr/week)			Credits Assigned		
U25PC304	Food Analysis Lab	Theory	Practical	Tutorial	Theory	Practical	Tutorial
		-	02	-	-	01	-

Course Code	Course Name	In Semester Evaluation		End Semester Exam (OE/POE)		
U25PC304	Food Analysis Lab	Term Work	Min pass %	Marks	Min pass %	Total (Marks)
		--	--	25	40	25

Evaluation Scheme

Course Outcomes: after the end of this course students will able to

CO1 Explain[2]Proximate analysis of food.

CO2 Indentify[2]Different component of food.

CO3 Analyze[3]quantitative and qualitative test of food.

List of Experiments

1. Determination of moisture content in given food samples.
2. Determination of pH value of food sample.
3. Determination of acidity of food sample by titration.
4. Determination of ash content in given food samples.
5. Estimation of carbohydrates by phenol sulfuric acid method in given sample.
6. Estimation of protein by Biuret method.
7. Estimation of Fat by Soxhlet method.
8. Estimation of crude fiber of given food sample.
9. Determination of carotenoids with respects to flour pigments.

Text Books

- Morris B. Jacobs, The chemical analysis of foods and food products.
- S. Ranganna, Hand book of analysis and quality control for fruit and vegetableproducts.

References

- D. T. Plummer, An introduction to practical biochemistry.
- Pomeranz, Y., Meloan, Food Analysis: Theory and practice

- Evaluation Scheme
  - Term work assessment shall be based on the overall performance of the student with every assignment graded from time to time.
  - The grades will be converted to marks as per ‘credit and grading system’ manual and should be added and averaged.
  - Based on above scheme grading and Term work assessment should be done.OE/POE shall be based on all Term work and work carried.

U25SE303 Milk and Milk Products Lab with POE

Course code	Course name	Teaching Scheme (Hr/week)			Credits Assigned		
U25SE303	Milk and Milk Products Lab	Theory	Practical	Tutorial	Theory	Practical	Tutorial
		-	04	-	-	02	-

Evaluation Scheme

Course Code	Course Name	In Semester Evaluation		End Semester Exam (OE/POE)		
U25SE303	Milk and Milk Products Lab	Term Work	Min pass %	Marks	Min pass %	Total (Marks)
		20	--	25	40	40

Course Outcomes: after the end of this course students will able to

CO1 Explain[2] Scope and status of dairy industry.

CO2 Identify[2] Different component of milk.

CO3 Application [3] of different methods for processing of milk.

List Of Experiments

1. Platform tests for milk. (Acidity, COB, specific gravity, SNF, Organoleptic test).
2. Estimation of milk fat.
3. Adulteration tests for different foods: Milk and milk products.
4. Preparation of Flavored milk.
5. Preparation of Curd.
6. Preparation of Shrikhand.
7. Preparation of Khoa.
8. Preparation of Paneer.
9. Preparation of whey based beverages.

Text Books

- De Sukumar - Outlines of Dairy Technology. Oxford Univ. Press. New Delhi.
- Robinson R. K. - Modern Dairy Technology. Elsevier Applied Science UK

References

- Warner J. M. - Principles of Dairy Processing. Wiley Eastern Ltd. New Delhi.
- Yarpar W. J. and Hall C. W. - Dairy Technology and Engineering. AVI Westport.

- Evaluation Scheme
  - Term work assessment shall be based on the overall performance of the student with every assignment graded from time to time.
  - The grades will be converted to marks as per ‘credit and grading system’ manual and should be added and averaged.
  - Based on above scheme grading and Term work assessment should be done.OE/POE shall be based on all Term work and work carried.

Programme Structure for B. Sc. Food Science and Technology

(minor in Medical Laboratory Technology)

Semester IV: Teaching Scheme

Course code	Course name	Teaching scheme (Hrs/week)			Credits assigned			Total credits
		Th	Pr	Tu	Th	Pr	Tu	
U25PC401	Bakery Technology	3	-	-	3	-	-	3
U25PC402	Food Packaging	2	-	-	2	-	-	2
U25PC403	Fruit and Vegetable Technology	3	-	-	3	-	-	3
UXXMM0XX	Multidisciplinary Minor-III	3	-	-	3	-	-	3
U03AE003 U03AE004 U03AE005	Modern Indian Language: Hindi OR Modern Indian Language: Sanskrit OR Modern Indian Language: Marathi	2	-	-	2	-	-	2
UXXOE04X	Open Elective-IV	2	-	-	2	-	-	2
U25PC404	Bakery Technology Lab	-	2	-	-	1	-	1
U25PC405	Fruit and Vegetable Technology	-	2	-	-	1	-	1
UXXMM0XX	Multidisciplinary Minor-III Lab	-	2	-	-	1	-	1
U25SE404	Food Quality Evaluation	-	4	-	-	2	-	2
U04CC0X	Co-curricular courses IV	-	4	-	-	2	-	2
U03VE002	Universal Human Values II	-	-	-	-	-	-	Audit Course
	Total	**14**	**16**	**-**	**14**	**08**	**-**	**22**

DETAILED SYLLABUS OF SEMESTER: IV

U25PC401 Bakery Technology Theory Course

Course code	Course name	Teaching Scheme (Hr/week)			Credits Assigned		
U25PC401	Bakery Technology	Theory	Practical	Tutorial	Theory	Practical	Tutorial
		03	-	-	03	-	-

Evaluation Scheme

Course Code	Course Name	Evaluation Scheme (In Semester)					End Semester Exam (ESE)		
U25PC 401	Bakery Technology	T1	T2	FET	Total	Min pass	Marks	Min pass	Total (Marks)
		10	10	5	25	40%	50	40%	75

Course Description:

This course will focus on and explore the ideas from view point of knowing and understanding the basic of bakery technology, basic ingredients of bakery products. It will also focus on learning the about the basic concepts of various methods that take place in bakery industry for analysis.

Course Outcomes: after the end of this course students will able to

CO1 Explain[2] bakery methodology

CO2 Indentify[2]Different bakery products.

CO3 Analyze[3]quantitative and qualitative test of bakery products .

CO4 Evalute[4]various component of bakery .

Course Contents

Module	Unit	Description	Hours
1.0		**Introduction of bakery**	
1	1.1	Introduction and Importance of bakery industry and bakery products.Basic ingredients used in bakery products	9
	1.2	Functions of ingredients in bakery product formulation.	

2.0		**Machinery used in bakery processing**	
2	2.1	Introduction to equipment and machinery used in bakery processing. Equipment for batch and continuous processing of bakery products	9
	2.2	Study the preservation of bakery products and quality aspect	
3.0		**Unit operations in baking**	
3	3.1	Types of flour, quality estimation of flour, various doughs and their use, Process parameter	9
	3.2	Heat transfer in baking, time temperature relationship in baking	
4.0		**Products and packaging**	
4	4.1	Fermentation and proofing, Procedures of Different types of bakery products - bread, cookies, crackers, cake and biscuits	9
	4.2	Cooling and packaging of baked products, Defects of baked products and preventive measures.	
5.0		**Preservation and quality aspect**	
5	5.1	Preservation of baked product, storage of baked product, packaging of baked product Canned bakery product	9
	5.2	Quality aspect of preserved bakedproducts.	

Text Books

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

2 Handbook of Baking and Bakery products, Rashmi. S. Sharma

References

1 FSSAI manuals of analysis of foods (2020), Bakery, Food Safety and Standards Authorityof India, Ministry of Health and Family Welfare, Government of India, New Delhi.

2 Professional Baking, Wayne Gisslen, Sixth Edition.

U25PC402 Food Packaging Theory Course

Course code	Course name	Teaching Scheme (Hr/week)			Credits Assigned		
U25PC402	Food Packaging	Theory	Practical	Tutorial	Theory	Practical	Tutorial
		02	-	-	02	-	-

Evaluation Scheme

Course Code	Course Name	Evaluation Scheme (In Semester)					End Semester Exam (ESE)		
U25PC402	Food Packaging	T1	T2	FET	Total	Min pass	Marks	Min pass	Total (Marks)
		10	--	5	15	40%	35	40%	50

Course Description:

This course will focus on and explore the ideas from viewpoint of knowing and understanding the basics of food packaging, imparting knowledge about the processing of packaging .

Course Outcomes: after the end of this course students will able to

CO1 Explain[2]Scope and status of packing industry.

CO2 Identify[2] Different component of plastic.

CO3 Application [3]in different products.

CO4 Evalute[2]Different manufacturing process.

Course Contents

Module	Unit	Description	Hours
1.0		**Introduction of food packaging**	
1	1.1	Introduction to food packaging- Scope and Importance and role of Food Packaging in food industry.	6
	1.2	Different food packaging materials used in India and all over the world	
2.0		**Packaging materials**	
2	2.1	Classification and types of Packaging materials.Paper: Introduction,	6

		types, advantages and disadvantages	
	2.2	Glass: Introduction, types, advantages and disadvantages Metal: Introduction, types, advantages and disadvantages	
3.0		**Plastic**	
3	3.1	Plastic as package material: Introduction, properties of plastic, types of plastic packaging:	6
	3.2	PET, HDPE, LDPE, PP, PVC, PS advantages anddisadvantages	
4.0		**Laminates & Coating**	
4	4.1	Laminates, Coating and Aseptic packaging: Introduction, need of laminating, types, properties, advantages and disadvantages of each type.	6
	4.2	Coating on paper and films, types of coatings, need of coating, methods of coatings, Biodegradable and edible packaging, aseptic packaging-need,advantages	
5.0		**Mechanical and functional tests on package**	
5	5.1	Packaging of specific foods according to their properties for bread, biscuitscoffee, milk powder, carbonated beverages, snack foods etc.,	6
	5.2	Mechanical and functional tests on package, various mechanical functional testes perform in laboratories on package boxes and package materials	

Text Books

1 A Handbook on Food Packaging, P. Jacob John

2 Handbook of Food Processing, Packaging and labeling, Jerry D'Souza and Jatin Pradhan

References

1 Food Packaging, Takashi Kadoya

2 Food Packaging, Prof. Neelam Khetarpaul and Dr. Darshan Punia

- Internal Assessment (T1, T2 and FET):
  - T1 should be based on first two modules and T2 should be based on next two modules, for 10 marks each.

- Fifth module will be assessed for 5 marks separately.

- End Semester Examination:
  - Question paper will comprise of 5 questions, each carrying 10 marks.
  - The duration of end semester examination shall be 2 hours.
  - The students need to solve all 5 questions.
  - Question No.1 will be compulsory and based on entire syllabus.
  - Remaining question (Q.2 to Q.5) will be selected from all the modules.

U25PC403 Fruit and Vegetable Technology

Theory Course

Course code	Course name	Teaching Scheme (Hr/week)			Credits Assigned		
U25PC403	Fruit and Vegetable Technology	Theory	Practical	Tutorial	Theory	Practical	Tutorial
		03	-	-	03	-	-

Evaluation Scheme

Course Code	Course Name	Evaluation Scheme (In Semester)					End Semester Exam (ESE)		
U25PC403	Fruit and Vegetable Technology	T1	T2	FET	Total	Min pass	Marks	Min pass	Total (Marks)
		10	10	5	25	40%	50	40%	75

Course Description: This course will focus on and explore the ideas from viewpoint of knowing and understanding the basics of fruit and vegetable, imparting knowledge about the classification and basic components, processing of fruit and vegetable.

Course Objectives:

1. To understand the basic classification of fruits and vegetables.
2. To study the different constituents of fruits and vegetables.
3. To application of fruits and vegetables in processed foods.

Course Outcomes: after the end of this course students will able to

CO1 Explain[2]Importance of fruit and vegetable.

CO2 Apply[3]Different method for processing of fruit product.

CO3 Apply[3]Different method for processing of vegetable product.

CO4 Evalute[4]Different preservation technique of fruit and vegetable.

U25PC403 Fruit and Vegetable Technology

Course Contents

Module	Unit	Description	Hours
1.0		**Introduction to fruits and vegetables**	
1	1.1	Scope and Importance of fruits and vegetable.	9
	1.2	Classification and composition of fruits and vegetables.	
2.0		**Post-harvest handling of fruits and vegetables**	
2	2.1	Post-harvest handling, canning and bottling of fruits and vegetables	9
	2.2	Spoilage in canned foods ,Processing of fruit juices.	
3.0		**Processing of fruits**	
3	3.1	Processing of squashes, cordials, nectar.	9
	3.2	Processing of concentrates and powder, Jam, Jelly, Marmalade, fruit leather.	
4.0		**Processing of vegetables**	
4	4.1	Pickles, chutneys and sauces Processing Causes of spoilage in pickling	9
	4.2	Tomato products -Processing of tomato juice, tomato puree, paste, ketchup, sauce and soup	
5.0		**Drying of fruits and vegetables**	
5	5.1	Dehydration of fruits and vegetables Sun drying & mechanical dehydration	9
	5.2	Process variation for fruits and vegetables, packing and storage. Storage of Fruits and Vegetables.	

Text Books

1 B.Srilakshmi.,(2018) Food Science,K,R, New age internationalPvt.Ltd 7th Edition

2 Woodroof, Jasper, ed. Commercial fruit processing.

References

1 Thompson, Anthony Keith. Fruit and vegetables: harvesting, handling and storage. John Wiley & Sons, 2008.

2 Barta, Jozsef, M. Pilar Cano, Todd W. Gusek, Jiwan S. Sidhu, and Nirmal K. Sinha. Handbook of fruits and fruit processing. Wiley-Blackwell, 2006.

- Internal Assessment (T1, T2 and FET):
  - T1 should be based on first two modules and T2 should be based on next two modules, for 10 marks each.
  - Fifth module will be assessed for 5 marks separately.
- End Semester Examination:
  - Question paper will comprise of 5 questions, each carrying 10 marks.
  - The duration of end semester examination shall be 2 hours.
  - The students need to solve all 5 questions.
  - Question No.1 will be compulsory and based on entire syllabus.
  - Remaining question (Q.2 to Q.5) will be selected from all the modules.

U25PC405 Fruit and Vegetable Technology Lab with out POE

Course code	Course name	Teaching Scheme (Hr/week)			Credits Assigned		
U25PC405	Fruit and Vegetable Technology Lab	Theory	Practical	Tutorial	Theory	Practical	Tutorial
		-	02	-	-	01	-

Course Code	Course Name	In Semester Evaluation		End Semester Exam (OE/POE)		
U25PC405	Fruit and Vegetable Technology Lab	Term Work	Min pass %	Marks	Min pass %	Total (Marks)
		--	--	25	40	25

Evaluation Scheme

Course Outcomes: after the end of this course students will able to

CO1 Explain[2]Importance of fruit and vegetable.

CO2 Apply[3]Different method for processing of fruit product.

CO3 Apply[3]Different method for processing of vegetable product.

List of Experiments

1. Preparation of squash and qualitative analysis.
2. Preparations of RTS qualitative analysis.
3. Preparation of nectar qualitative analysis.
4. Preparation of Jam qualitative analysis.
5. Preparation of Marmalade qualitative analysis.
6. Preparations of Jellies qualitative analysis.
7. Preparation of Tomato Ketchup qualitative analysis.
8. Preparations of Preserve and Candied Fruit qualitative analysis.
9. Preparation of Pickle qualitative analysis

Text Books

- B.Srilakshmi.,(2018) Food Science,K,R, New age internationalPvt.Ltd 7th Edition

References

- Thompson, Anthony Keith. Fruit and vegetables: harvesting, handling and storage. John Wiley & Sons, 2008.
- Barta, Jozsef, M. Pilar Cano, Todd W. Gusek, Jiwan S. Sidhu, and Nirmal K. Sinha. Handbook of fruits and fruit processing. Wiley-Blackwell, 2006.

- Evaluation Scheme
  - Term work assessment shall be based on the overall performance of the student with every assignment graded from time to time.
  - The grades will be converted to marks as per ‘credit and grading system’ manual and should be added and averaged.
  - Based on above scheme grading and Term work assessment should be done.OE/POE shall be based on all Term work and work carried.

U25PC404 Bakery Technology Lab without POE

Course code	Course name	Teaching Scheme (Hr/week)			Credits Assigned		
		Theory	Practical	Tutorial	Theory	Practical	Tutorial
U25PC404	Bakery Technology Lab	-	02	-	-	01	-

Evaluation Scheme

Course Code	Course Name	In Semester Evaluation		End Semester Exam (OE/POE)		
		Term Work	Min pass %	Marks	Min pass %	Total (Marks)
U25PC404	Bakery Technology Lab	--	--	25	40	25

Course Outcomes: after the end of this course students will able to

CO1 Indentify[2]Different bakery products.

CO2 Analyze[3]quantitative and qualitative test of bakery products .

CO3 Evalute[4]various component of bakery .

List of Experiments

1. Determination of gluten content in wheat flour.
2. Preparation of bread and its qualitative analysis.
3. Preparation of sponge cake and its qualitative analysis.
4. Preparation of instant cake mix and its qualitative analysis.
5. Preparation of biscuits and its qualitative analysis.
6. Preparation of butter cookies and its qualitative analysis.
7. Preparation of Rusk and its qualitative analysis.
8. Preparation of Crackers and its qualitative analysis

Text Books

Morris B. Jacobs, The chemical analysis of foods and food products.

S. Ranganna, Hand book of analysis and quality control for fruit and vegetableproducts.

References

D. T. Plummer, An introduction to practical biochemistry.

Pomeranz, Y., Meloan, Food Analysis: Theory and practice

- Evaluation Scheme
    - Term work assessment shall be based on the overall performance of the student with every assignment graded from time to time.
    - The grades will be converted to marks as per ‘credit and grading system’ manual and should be added and averaged.
    - Based on above scheme grading and Term work assessment should be done.OE/POE shall be based on all Term work and work carried.

U25SE404 Food Quality Evaluation

Teaching Scheme with POE

Course code	Course name	Teaching Scheme (Hr/week)			Credits Assigned		
		Theory	Practical	Tutorial	Theory	Practical	Tutorial
U25SE404	Food Quality Evaluation	-	04	-	-	02	-

Evaluation Scheme

Course Code	Course Name	In Semester Evaluation		End Semester Exam (OE/POE)		
		Term Work	Min pass %	Marks	Min pass %	Total (Marks)
U25SE404	Food Quality Evaluation	20	--	25	40	40

Course Outcomes: after the end of this course students will able to

CO1 Explain[2] types of hazards associated with food

CO2 Explain[2]knowledge on food regulations (national as well as international)

CO3 Analyze[3]the design and implementation of food safety management .

List of Experiments

1. Colorimetric evaluation of food quality.
2. Quality evaluation of product for size, shape.
3. Determination of textural quality profile.
4. Determination of color by using lovibond tintometer.
5. Testing of food product for sensory evaluation on 9-point hedonic scale.
6. Simple difference tests for sensorial evaluation.
7. Directional difference tests for sensorial evaluation.
8. Writing Standard Operating Procedures.
9. Application of HACCP to products.
10. Visit to units with GMP, ISO, HACCP certified plant

Text Books

De Sukumar - Outlines of Dairy Technology. Oxford Univ. Press. New Delhi.
Robinson R. K. - Modern Dairy Technology. Elsevier Applied Science UK

References

Warner J. M. - Principles of Dairy Processing. Wiley Eastern Ltd. New Delhi.

Yarpar W. J. and Hall C. W. - Dairy Technology and Engineering. AVI Westport.

- Evaluation Scheme
    - Term work assessment shall be based on the overall performance of the student with every assignment graded from time to time.
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