

DRAFT SYLLABUS FOR APPROVAL

IN

B.Voc. Food Processing

(6 Semester Course)

UNIVERSITY OF KERALA

THIRUVANANTHAPURAM

1. Introduction

All India Council for Technical Education (AICTE) Ministry of HRD, Government of India has introduced Entrepreneurship oriented Skill development courses of **B. Voc. FOOD PROCESSING.**

Food processing involves a combination of procedures to achieve the intended changes to the raw materials. These are conveniently categorized as unit operations, each of which has a specific, identifiable and predictable effect on a food. Unit operations are grouped together to form a process. The combination and sequence of operations determines the nature of the final product.

Food technologists & technicians are required in this industry for the practical application of the principles in the manufacturing or production, preservation and packaging, processing and canning of various food products.

These courses will be run by AICTE approved institutes by using available infrastructure and facilities. In these courses the institute will conduct general education content and sector specific skills will be imparted by Skill Knowledge Providers/ Training Providers/ Industries.

1.1 Key Features:

Objectives

To provide judicious mix of skills relating to a profession and appropriate content of General Education.

To ensure that the students have adequate knowledge and skills, so that they are work ready at each exit point of the programme.

To provide flexibility to the students by means of pre-defined entry and multiple exit points.

To integrate NSQF within the Diploma, undergraduate level of higher education to enhance employability of the students and meet industry requirements. Such student apart from meeting the needs of local and national industry are also expected to be equipped to become part of the global workforce.

To provide vertical mobility to students admitted in such vocational courses.

The certification levels will lead to Diploma/Advanced Diploma/B. Voc. Degree in Food Processing and will be offered by the University.

Students may be awarded Diploma/Advance Diploma /Degree as out-lined in the Table below:

Award	Duration after class XII	Corresponding NSQF level
Diploma	1 Year	5
Advance Diploma	2 Year	6
B.Voc Degree	3 Year	7

2. Course Objectives

After successfully completing the vocational course, the student would have acquired relevant appropriate and adequate technical knowledge together with the professional skills and competencies in the field of Food Processing so that he/she is properly equipped to take up gainful employment in this Vocation. Thus he/she should have acquired: -

A. Understanding of

- (a) The concepts, principles of working of Food Industry.
- (b) The procedure of making Quality Control Standards.
- (c) The concepts and principles used in Plant and Sanitation Equipments.

B. Adequate Professional Skills and Competencies in

- (a) Knowledge of Food Industrial Technologies.
- (b) Testing the performance of various equipment's and instruments.
- (c) Knowledge of component level and at the stage level.

C. A Healthy and Professional Attitude so that He/ She has

- (a) An analytical approach while working on a job.
- (b) An open mind while locating/rectifying faults.
- (c) Respect for working with his/her own hands.
- (d) Respect for honesty, punctuality and truthfulness

D. NSQF compliant skills in Qualification developed by sector skill council in Food Processing sector

3. Course Structure

The course will consist of combination of practice, theory and hands on skills in the Food Processing sector.

Skill Components:

The focus of skill components shall be to equip students with appropriate knowledge, practice and attitude, to become work ready. The skill components will be relevant to the industry as per its requirements.

The curriculum will necessarily embed within itself, National Occupational Standards (NOSs) of specific job roles within the industry. This would enable the students to meet the learning outcomes specified in the NOSs.

The overall design of the skill development component along with the job roles selected will be such that it leads to a comprehensive specialization in few domains.

The curriculum will focus on work-readiness skills in each of the year of training.

Adequate attention will be given in curriculum design to practical work, on the job training, development of student portfolios and project work.

General Education Component:

The general education component adhere to the normal senior secondary and university standards. It will emphasize and offer courses which provide holistic development. However, it will not exceed 40% of the total curriculum.

Adequate emphasis is given to language and communication skills.

The curriculum is designed in a manner that at the end of each year after class XIIth students can meet below mentioned level descriptors of NSQF:

Level	Process required	Professional Knowledge	Professional skill	Core skill	Responsibility
5	Job that requires well developed skill, with clear choice of procedures in familiar context	Knowledge of facts, principles, processes and general concepts, in a field of work or study	A range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying basic methods, tools materials and information	Desired mathematical skill, understanding of social, political and some skill of collecting and organizing information, communication.	Responsibility for own work and learning and some responsibility for other's works and learning
6	Demand	Factual and	A range of	Reasonably	Responsibilit

	s wide range of specialized technical skill, clarity of knowledge and practice in broad range of activity involving standard / non-standard practices	theoretical knowledge in broad contexts within a field of work or study	cognitive and practical skills required to generate solutions to specific problems in a field of work or study	good in mathematical calculation, understanding of social, political and reasonably good in data collecting organizing information, and logical communication	y for own work and learning and full responsibility for other's works and learning
7	Requires a command of wide ranging specialized theoretical and practical skill, involving variable routine and non-routine context	Wide ranging, factual and theoretical knowledge in broad contexts within a field of work or study	Wide range of cognitive and practical skills required to generate solutions to specific problems in a field of work or study	Good logical and mathematical skill understanding of social political and natural environment good in collecting and organizing information, communication and presentation skill	Full responsibility for output of group and development

3.1. STRUCTURE OF B.VOC. FOOD PROCESSING

a) Title

Regulations for conducting B. Voc Programme under University of Kerala

b) Scope

The regulations stated in this document shall apply to all B.Voc Programmes Conducted by colleges affiliated to University of Kerala, Approved by AICTE with effect from _____ admission.

4. Definitions

4.1B.Voc: Bachelor of Vocation- is a scheme introduced by UGC for skill development based higher education as part of college/university education.

4.2 NSQF: National Skills Qualifications Framework

4.3 Programme: A Programme refers to the entire course of study and examinations for the award of the B. Voc degree.

4.4 Semester: A term consisting of a minimum of 450 contact hours distributed over 90 working days, inclusive of OJT & examination days, within 18 five- day academic weeks.

4.5 Course: Refers to the conventional paper, which is portion of the subject matter to be covered in a semester. A semester shall contain many such courses from general and skill development areas.

4.6 Credit: B. Voc programme follows a credit semester system and each Course has an associated credit.

4.7 Grade: Uses seven point grading system suggested by Hridayakumari Commission to assess the students.

4.8 Words and expressions used and not defined in this regulation shall have The same meaning assigned to them in the Act and Statutes.

5. Eligibility for Admission

Eligibility for admissions and reservation of seats for B. Voc. Food Processing Technology shall be according to the rules that no student shall be eligible for admission to B. Voc. Food Processing Technology unless he/she has successfully completed the examination conducted by a Board/ University at the +2 level of schooling or its equivalent.

6. Duration of the Course

Duration of B. Voc. Food Processing Technology programme shall be 6 semesters distributed over a period of 3 academic years. Each semester shall have 90 working days inclusive of OJT & all examinations.

6.1 The duration of B.Voc programmes shall be **6 Semesters**.

6.2 The duration of odd semesters shall be from **June to October** and that of even semesters from **November to March**.

6.3 A Student may be permitted to complete the Programme, on valid reasons, within a period of 12 continuous semesters from the date of commencement of the first semester of the programme.

6.4 The certification levels will lead to Diploma /Advanced Diploma /B.Voc. Degree and will be offered under the aegis of the University as outlined in the Table given below

Awar d	Duration after class XII	Corresponding NSQF level
Diploma	1 Year	5
Advance Diploma	2 Year	6
B.Voc Degree	3 Year	7

7. Nature of the Course

- a) No open course is envisaged
- b) No Electives are included
- c) Total credits is 177
- d) Working hours per week is 30 hours
- e) All vocational subjects are treated as core course.
- f) Multiple exit points are permitted.
- g) A candidate who failed in a semester may get two supplementary chances. Only failed papers are to be written in the supplementary examination.

8. Readmission

Readmission will be allowed as per the prevailing rules and regulations of the university.

9. Assessment

9.1 NSQF Parameters for Assessment and Certification

Assessment and certification will be done by the respective university as is done now. Certificates issued post assessment will mention that the level of the NSQF at which it lies

9.2 The evaluation of each course shall consists of two parts

- A. Continuous Evaluation or Internal Assessment (CE)
- B. End Semester Evaluation (ESE)

The CE & ESE ratio shall be 1: 4 for all courses except to that of On the Job Training Report, Log Book and Project Dissertation. For On the Job Training report, Log Book and Project Dissertation, there is no CE/IA and marks/grade are awarded based on ESE and Viva voce. Grades are given on a 7 point scale based on the total percentage of mark (CE + ESE) as given below.

Percentage of marks	CCPA	Letter Grade
90 and above	9 and above	A+ Outstanding
80 to < 90	8 to < 9	A Excellent

70 to < 80	7 to < 8	B Very good
60 to < 70	6 to < 7	C Good
50 to < 60	5 to < 6	D Satisfactory
40 to < 50	4 to < 5	E Adequate
Below 40	< 4	F Failure

1. Regular Semester Examinations will be conducted at the end of each semester. The duration of Examinations will be three (3) hours for those subjects having 100 Marks and two (2) hours for those subjects having 50 Marks. Semester examinations shall be conducted and results will be announced by the University. The examination for the practical courses will be held at the end of each semester. The University will issue the semester mark list after each semester examination and the final consolidated mark list showing the marks scored in all the eight semesters after the successful completion of the B.VOC Degree programme.

2. For subjects with 100 as the maximum marks, the end semester examination will have 80 marks and the internal assessment will have 20 marks. Subjects with 50 as the maximum marks will have 40 marks for the end semester examination and 10 marks for the internal assessment.

3. The Internal Assessment shall be done on the basis of (i) Periodical tests, subject to minimum of two tests for each subject. (ii) Assignments and (iii) class Participation and attendance. The distribution of marks for the internal assessment will be as follows:

All records of internal assessment shall be kept in the department and shall be made available for verification by the university if and when necessary.

(a) Periodical tests 5/ 10 marks

(b) Assignments 3 / 6 marks

(c) Class Participation and attendance 2 / 4 marks

Total

10 / 20 marks

4. A systematic record for the award of Internal Assessment marks shall be maintained in the Department signed by the Faculty member concerned and counter signed by the Head of the Department/Institution. The results of internal assessment shall be made available within 5 working days from the last day of the semester. The complaints regarding award of marks for CE/IA if any have to be submitted to the Head of the Department within 3 working days from the display of the results. These complaints have to be examined by the department committee and shall arrive at a decision which shall be communicated to the student.

The statement of marks of the CE/IA of all the students shall be approved by

the Department committee countersigned by the Principal and forwarded to the Controller of Examinations within 15 working days from the last day of the semester

5. Semester examinations for the B.Voc programme for each subject shall be conducted at the end of the each semester. There will be supplementary semester examinations for failed candidates.

6. Candidates for the B.Voc Programme shall be eligible to undergo the course of study in the next semester and take the examinations of that semester, irrespective of the results of the examination of the previous semester provided they have completed all the formalities of attendance, payment of all fees due to the University and registration for the examination in the earlier semester. However, a candidate who has failed to secure the required minimum marks in any subject shall be given a maximum of three additional chances for securing a pass in such subject.

7. Students participating in social service activities, sports, literary and cultural activities will be carried out outside the instructional hours and will fetch the one credit extra over and above the prescribed 160 credits. There shall be a general coordinator to be nominated by the College Council for the conduct of all these activities. A statement testifying the participation of the students shall be forwarded to the controller of Examination along with the statement of CE/IA.

8. The norms for moderation will as per the norms of University of Kerala applicable to the other under graduate programmes.

Course code	Subjects	No of Hours /Week		Total hours /semester	Credits	Total Marks		Exam Duration
		Bachelo of Vocation (B.Voc) in Food Processing				EXT	IC	
		T	P			First semester syllabus		
B.V.FP-01	Bakery & Confectionery	5	-	50	3	40	10	2
B.V.FP-02	Introduction to Food Processing	5	-	50	3	40	10	2
B.V.FP-03	Food Quality Analysis	5	-	50	3	40	10	2
B.V.FP- 4	Communication Skill in English	5	-	50	3	40	10	2
Lab/Practical								
B.V.FP- 5	Bakery & Confectionery	-	4	50	1.5	40	10	3
B.V.FP- 6	Food Processing Technology - 1	-	4	50	1.5	40	10	3
On-Job-Training(OJT)								
Baking Technician/Assistant Lab Technician				150	15	200		
Total		20	8	450	30	440	60	
Total marks of University		E		IC		Total		
		160	280	40	20	500		
		440		60				

Bachelor of Vocation (B.Voc) in Food Processing
Proposed Syllabus
Second semester syllabus

Course code	Subjects	No of Hours /Week		Total hours /semester	Credits	Total Marks		Exam Duration
						EXT	IC	
		T	P					
B.V.FP-07	Food Processing Technology-1	5	-	50	3	40	10	2
B.V.FP-08	Food Science & Nutrition	5	-	50	3	40	10	2
B.V.FP-09	Dairy Technology	5	-	50	3	40	10	2
B.V.FP-10	Food Chemistry	5	-	50	3	40	10	2
Lab/Practical								
B.V.FP-11	Food Processing Technology-1	-	4	50	1.5	40	10	3
B.V.FP-12	Traditional Indian Dairy Products Lab	-	4	50	1.5	40	10	3
On-Job-Training(OJT)								
Biscuit Production Specialist/ Dairy Product Processor				150	15	200		
Total		20	8	450	30	440	60	
Total marks of University		E		IC		Total		
		160	280	40	20	500		
		440		60				

Bachelor of Vocation (B.Voc) in Food Processing
Proposed Syllabus
Third semester syllabus

Course code	Subjects	No of Hours /Week		Total hours /semester	Credits	Total Marks		Exam Duration
		T	P			EXT	IC	
B.V.FP-13	Sensory Evaluation of Foods	5	-	50	3	40	10	2
B.V.FP-14	Food Packaging Technology	5	-	50	3	40	10	2
B.V.FP-15	Processing of Meat, Fish & Poultry	5	-	50	3	40	10	2
B.V.FP-16	Entrepreneurship Development	5	-	50	3	40	10	2
Lab/Practical								
B.V.FP-17	Food Processing Technology & Sensory Evaluation	-	4	50	1.5	40	10	3
B.V.FP-18	Food Quality Analysis	-	4	50	1.5	40	10	3
On-Job-Training(OJT)								
Pickle Making Technician/ Jam, Jelly & Ketchup Processing				150	15	200		
Total		20	8	450	30	440	60	
Total marks of University		E		IC		Total		
		160	280	40	20	500		
		440		60				

Bachelor of Vocation (B.Voc) in Food Processing
Proposed Syllabus
Fourth semester syllabus

Course code	Subjects	No of Hours /Week		Total hours /semester	Credits	Total Marks		Exam Duration
		T	P			EXT	IC	
		B.V.FP-19	Ice cream & Frozen Deserts			5	-	
B.V.FP-20	Food Plant Layout	5	-	50	3	40	10	2
B.V.FP-21	Technology of Beverages	5	-	50	3	40	10	2
B.V.FP-22	Food Processing Equipments	5	-	50	3	40	10	2
Lab/Practical								
B.V.FP-23	Ice cream & Frozen Deserts	-	4	50	1.5	40	10	3
B.V.FP-24	Food Plant Layout	-	4	50	1.5	40	10	3
On-Job-Training(OJT)								
Ice Cream Technician/Plant Biscuit Production Specialist				150	15	200		
Total		20	8	450	30	440	60	
Total marks of University		E		IC		Total		
		160	280	40	20	500		
		440		60				

Bachelor of Vocation (B.Voc) in Food Processing

Proposed Syllabus
Fifth semester syllabus

Course code	Subjects	No. of Hours /Week		Total hours /semester	Credits	Total Marks		Exam Duration	
		T	P			EXT	IC		
									EXT
B.V.FP-25	By product utilization	5	0	50	3	40	10	2	
B.V.FP-26 31	Marketing Management & Trade Management	5	-	50	3	40	10	2	
B.V.FP-27 32	Food Quality, Safety & Management	5	-	50	3	40	10	2	
B.V.FP-28	Food plant Sanitation	5	-	50	3	40	10	2	
Lab/Practical									
B.V.FP-29	By product utilization	-	4	50	1.5	40	10	3	
B.V.FP-30	Traditional Indian Dairy products	-	4	50	1.5	40	10	3	
On-Job-Training(OJT)									
Traditional Snack and savory Maker/Fish & Sea Food Processing Technician				150	15	200			
Total		20	8	450	30	440	60		
Total marks of University		E		IC		Total			
		160	280	40	20	500			
		440		60					

Bachelor of Vocation (B.Voc) in Food Processing
Proposed Syllabus
Sixth semester syllabus

33	Management & Cost Accounting							
B.V.FP-34	Project Work	5	-	50	3	150	-	2
On-Job-Training(OJT)								
Production Manager				150	15	200		
Total		20	8	450	30	470	30	
Total marks of University		E		IC		Total		
		120	350	30		500		
		470		30				

11. Evaluation

The evaluation of each course shall contain two parts- Sessional Assessment and Final Assessment. The Sessional and Final Assessment shall be made using a Mark-Based Grading System on a 7-point scale. Overall Sessional: Final ratio will be maintained as 10:40.

11.1. Theory Examinations

a. Sessional

The sessional evaluation is to be done by continuous assessment of the following components. The components of the evaluation for theory and practical and their weights are as below.

I. Distribution of Sessional marks:

a. Theory courses

Components	Marks
Attendance	2
Practical Record	3
Test paper	5
Total	10

b. Practical courses

Components	Marks
Attendance	2
Practical record	3
Test paper	5
Total	10

11.2 Attendance Evaluation

A candidate will be permitted to register and appear for the examination at the end of each semester only if:

- He/She has secured not less than 75% of attendance in each subject, in each semester.
- His /Her progress is satisfactory.

In case of shortage of attendance, the candidate is eligible for condonation of the shortage of attendance on the recommendation of the Head of the Institution subject to the rules framed in this regard by the University from time to time. A student who is not eligible for condonation of shortage of attendance shall repeat the course when it is offered again. This provision is allowed only twice during the entire course.

The students have to submit practical records duly certified by the concerned subject faculty to appear for the practical examination.

11.3 Assignment/Seminar/Viva

Each student has to take one assignment or one seminar presentation per course from first to fifth semester. The students should compulsory take one seminar presentation on sixth semester.

11.4. Test Paper

Average mark of two sessional examinations shall be taken.

11.5. Theory Examinations

A question paper shall be a judicious mix of very short answer type, short answer type, short essay type / problem solving type and long essay type questions.

1. Each question paper has four parts A, B, C & D.
2. **Part A** contains 10 questions of 1 mark each all of which the candidate has to answer.
3. **Part B** contains 12 short answer type questions spanning the entire syllabus and the candidate has to answer 9 questions. Each question carries 2 marks.
4. **Part C** contains 6 problem type questions / short essays spanning the entire syllabus and the candidate has to answer 3 questions. Each question carries 4 marks. But, for open courses, Part C contains short essay type questions only.
5. The total marks for courses are 40.

11.6 Practical Examinations

The practical examinations are to be conducted at the end of every semester by the institution. The external examiner shall be selected by the university. The score sheet should be sent to the Controller of Examinations soon after the evaluation.

11.7 Internship Evaluation

The total marks of evaluation of the internship at various Food Processing Industries will be on 200 Marks including presentation of the report and viva – voce.

11.8 Project Evaluation

All students have to begin working on the project in the **fifth** semester and must submit it in the **sixth** semester.

Course code	Subjects	No of Hours /Week		Total hours /semester	Credits	Total Marks		Exam Duration
						EXT	IC	
		T	P					
B.V.FP-01	Bakery & Confectionery	5	-	50	3	40	10	2
B.V.FP-02	Introduction to Food Processing	5	-	50	3	40	10	2
B.V.FP-03	Food Quality Analysis	5	-	50	3	40	10	2
B.V.FP- 4	Communication Skill in English	5	-	50	3	40	10	2
Lab/Practical								
B.V.FP- 5	Bakery & Confectionery	-	4	50	1.5	40	10	3
B.V.FP- 6	Food Processing Technology - 1	-	4	50	1.5	40	10	3
On-Job-Training(OJT)								

Proposed Syllabus

First semester syllabus

Baking Technician/Assistant Lab Technician			150		15		200	
Total	20	8	450		30		440	60
Total marks of University	E		IC			Total		
	160	280	40	20		500		
	440		60					

Syllabi of Skill and General Courses

Bachelor of Vocation (B.Voc) in Food Processing

First semester syllabus

Aim of the course: To impart basic and applied technology of baking & confectionary and acquaint with the manufacturing technology of bakery and Confectionary products.

Course Overview and Context

- To highlight the processing methods used in baking and confectionery industries.
- To know about the various types of food products made using baking technology.
- To have a basic idea about baking and confectionery manufacture and quality control.
- To know about the importance of each ingredient in the bakery and how it effects the overall product and its sensory and quality parameters.
- To be able to start a small scale bakery and confectionery unit

Name of the Course : BAKERY AND CONFECTIONERY			
Course Code :B.V.FP-01		Semester- I	
Duration :75 hrs		Maximum Marks :50	
Teaching Scheme		Examination Scheme	
Theory : 5hrs /week		CE/IC Mark:10 Marks	
Credit :3		End Semester Exam : 40 Marks	
Unit No	Contents	Hrs	WEIG HTAGE
1	Manufacture of Sugar	14	15%

	Sugarcane, jaggery, khandasari sugar, raw sugar, refined sugar, white sugar, beet sugar, manufacture of sugar from sugar cane, refining of sugar.		
2	Classification of confectionery Sugar boiled confectionery- crystalline and amorphous confectionery, rock candy, hard candy, lemon drop, china balls, soft candy, lollypop, marshmallows, fudge, cream, caramel, toffee, lozenges, gumdrops, honeycomb candy	12	10%
3	Properties of wheat Wheat – Properties, Quality – Hardness, Gluten strength, protein content, soundness. Methodology and approaches to evaluate bread and bread – wheat quality –processing factors, product factors.	15	25%
4	Principles of baking and Bread manufacturing Major baking ingredients and their functions, role of baking ingredients in improving the quality of bread. Characteristics of good flour used for making bread, biscuits and cakes. Ingredients used for bread manufacture, methods of mixing the ingredients, dough development methods - straight dough, sponge dough, moulding, proofing, baking, packing, spoilage, bread staling, methods to reduce bread staling and spoilage.	20	10%
5	<u>Cake and Biscuit manufacturing</u> Processing of cakes and biscuits- ingredients, development of batter, baking and packing, Spoilage in cakes and biscuits	14	40%

Reference books:

1. Zhou. W, HuiY, H; (2014), "Bakery Products Science and Technology", 2nd Edition, Wiley Blackwell Publishers,
2. Pyler, E. J. and Gorton, L.A. (2009), "Baking Science & Technology" Vol.1 Fourth Edition, Sosland Publications.
3. Stanley P. Cauvain, Linda S. Young, (2008), "Baked Products: Science Technology and Practice". John Wiley & Sons Publishers

B.V.FP-02-INTRODUCTION TO FOOD PROCESSING

Aim of the course: To make students understand about the mechanism of spoilage and deterioration in foods, the basic food preservation principles, and methods to preserve foods.

Course Overview and Context

To study the different ways in which food spoilage occurs and the techniques to prevent it.

To know the different spoilage agents and the ways in which they act on food.

To understand the principles behind the various methods of food preservation.

To know how to use these principles to preserve different types of foods.

To study the method of action of different preservatives.

Name of the Course : INTRODUCTION TO FOOD PROCESSING			
Course Code :B.V.FP-02		Semester- I	
Duration :75 hrs		Maximum Marks :50	
Teaching Scheme		Examination Scheme	
Theory : 5hrs /week		CE/IC Mark:10 Marks	
Credit :3		End Semester Exam : 40 Marks	
Unit No	Contents	Hrs	WEIG HTAGE
1	Food Spoilage Definition, types of spoilage - physical, enzymatic, chemical and biological spoilage. Mechanism of spoilage and its end products, shelf life determination.	15	15%

2	Preservation by using Preservatives Food preservation: Definition, principles, importance of food preservation, traditional and modern methods of food preservation. Food additives – definition, types, Class I and Class II preservatives.	15	10%
3	Preservation by use of high temperature Pasteurization: Definition, types, Sterilization, Canning - history and steps involved, spoilage encountered in canned foods, types of containers used for canning foods. Food irradiation – Principles, merits and demerits, effects of irradiation and photochemical methods.	15	25%
4	Preservation by use of Low Temperature Refrigeration - advantages and disadvantages, freezing: Types of freezing, common spoilages occurring during freezing, difference between refrigeration and freezing.	15	10%
5	Preservation by Removal of Moisture Drying and dehydration - merits and demerits, factors affecting, different types of drying, Concentration: principles and types of concentrated foods.	15	40%

Reference Books

1. Gould, G. W. (2012), "New Methods of food preservation", Springer Science & Business Media.
2. Manay, N.S. Shadaksharaswamy, M. (2004), "Foods- Facts and Principles", New age international publishers, New Delhi.
3. Srilakshmi, B. (2003), "Food Science", New Age International Publishers, New Delhi.
4. Subalakshmi, G and Udipi, S.A. (2001), "Food processing and preservation". New

B.V.FP-03-FOOD QUALITY ANALYSIS

Name of the Course : FOOD QUALITY ANALYSIS			
Course Code :B.V.FP-03		Semester- I	
Duration :75 hrs		Maximum Marks :50	
Teaching Scheme		Examination Scheme	
Theory : 5hrs /week		CE/IC Mark:10 Marks	
Credit :3		End Semester Exam : 40 Marks	
Unit No	Contents	Hrs	WEIG HTAGE
1	Basics of Food Science and Food Analysis, Concept, objectives and need of food quality.	14	15%
2	Measurement of colour, flavour, consistency, viscosity, texture and their relationship with food quality and composition.	12	10%
3	Sampling; purpose, sampling techniques, sampling procedures for liquid, powdered and granular materials, Sensory evaluation methods, panel selection methods, Interpretation of sensory results. Instrumental method for testing quality.	15	25%
4	Food adulteration and food safety. TQM and TQC, consumer preferences and acceptance, Food Safety Management Systems GAP, GHP, GMP, Hazards and HACCP (Hazard analysis and critical control point),	20	10%
5	Sanitation in food industry (SSOP), Food Laws and Regulations in India, FSSAI, Food grades and standards BIS, AGMARK, PFA, FPO, ISO 9000, 22000 Series. CAC (Codex Alimentarius)	14	40%

	Commission), Traceability and Quality Assurance system in a process plant, Bio safety and Bioterrorism.		
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B.V.FP-04- COMMUNICATION SKILL IN ENGLISH

Aim of the course: To enhance LSWR skills so that students may effectively communicate in the English language

Course Overview and Context

The course aims at training students in the usage of English Language in various contexts and enabling them to communicate effectively in English.

Competencies of the course

To re-introduce students to the basics of English grammar so that they may comprehend, speak and write grammatical correct English.

To enable the students to speak English confidently and effectively in a wide variety of situations.

To help the students to improve their reading efficiency by refining their reading strategies.

To develop the ability to compose pieces o literary writing.

Name of the Course : COMMUNICATION SKILL IN ENGLISH			
Course Code :B.V.FP-04		Semester- I	
Duration :75 hrs		Maximum Marks :50	
Teaching Scheme		Examination Scheme	
Theory : 5hrs /week		CE/IC Mark:10 Marks	
Credit :3		End Semester Exam : 40 Marks	
Unit No	Contents	Hrs	WEIG HTAGE
1	Grammar Articles, The Verb, Active and Passive Voice, Tenses, Concord, Modal Auxiliaries,The Adverb, The Preposition, Conjunction, Idioms, Phrasal Verbs, Direct and IndirectSpeech.	14	15%
2	Listening Active listening, Barriers to listening, Listening and note taking, Listening to announcements, Listening to news on the radio and	12	10%

	television.		
3	Speaking Brief introduction to the Phonetic script, Falling and rising tones, Participating in conversations, Small Talk, Making a short formal speech, telephone skills.	15	25%
4	Reading Reading: theory and Practice, Scanning, Surveying a textbook using an index, Reading for information, Understanding text structure, Locating main points, Making inferences, Reading graphics, Reading for research.	20	10%
5	Writing Describing people, place, events and things, Short Stories, Vocabulary and Comprehension, Guide to letter writing.	14	40%

References

1. Sasikumar V, KiranmaiDutt, P and GeethaRajeevan (2007), "Communication Skills in English", Cambridge University Press, New Delhi.
2. Alec Fisher (2011), "Critical Thinking: An Introduction", Cambridge University Press, New Delhi.
3. Stephen Bailey, (2010), "Academic Writing: A Handbook for International Students", Routledge Publishers.
4. IlonaLeki (1998), "Academic Writing: Exploring Processes and Strategies", Cambridge University Press. New Delhi.
5. Patsy McCarthy, Caroline Hatcher (2002), "Presentation Skills: The Essential Guide for Students (StudySkills), SAGE Publishers

B.V.FP-05- BAKERY AND CONFECTIONERY LAB

Name of the Course : BAKERY AND CONFECTIONERY LAB		
Course Code :B.V.FP-05	Semester- I	
Duration :32hrs	Maximum Marks :50	
Teaching Scheme	Examination Scheme	
Practical : 4hrs /week	CE/IC Mark:10 Marks	
Credit :1.5	End Semester Exam : 40 Marks	
Unit .No	Contents	Hours
1.	I. GENOISE SPONGE II. BUTTER CAKE III. PRESS COOKKIES IV. DOUGH NUTS	04
2	II. TORTA DI APPLE CAKE III. PANATONI BREAD IV. BREAD LOAF	04
3	I. CHOCOLATE BUTTER CAKE II. SWISS ROLL III. LAVOCHE	04
4	I. CHOCOLATE ECLAIRS II. CHRISTMAS FRUIT CAKE III. CIABATTA	04
5	I. CHOCOLATE MADELINES II. ALMOND ANISE BISCOTTI III. CHOCOLATE SOUFFLE	04
6	I. LEMON MERINGUE PIE II. EGG PUFFS III. MASALA BISCUITS IV. FOCACCIA BREAD	04

7	I. ORANGE CHIFFON CAKE II. CHICKEN PUFFS III. DANISH PASTRY	04
8	I. FRUIT MUFFINS II. BLACK FOREST CAKE III. DILKUSH	04

B.V.FP-06- FOOD PROCESSING TECHNOLOGY- LAB

Name of the Course : FOOD PROCESSING TECHNOLOGY- LAB		
Course Code :B.V.FP-06		Semester- I
Duration :32hrs		Maximum Marks :50
Teaching Scheme		Examination Scheme
Practical : 4hrs /week		CE/IC Mark:10 Marks
Credit :1.5		End Semester Exam : 40 Marks
Unit .No	Contents	Hours
1.	Demonstration of various perishable food items and degree of spoilage	04
2	Blanching of selected food items; Preservation of food by heat treatment- pasteurization;	04
3	Preservation of food, concentration of sugar: Jam; Preservation of food by using salt: Pickle; Preservation of food by using acidulants i.e. pickling by acid, vinegar or acetic acid;	04
4	Preservation of food by using chemical preservatives; Preservation of bread, cake using mold inhibitors;	04
5	Drying of fruit slices pineapple slices, apple slices in cabinet drier; Drying of green leafy vegetables;	04
6	Drying of mango/other pulp by foam-mat drying; Drying of semisolid foods using roller dryers; Drying of foods using freeze-drying process;	04
7	Demonstration of preserving foods under cold vs. freezing process; Processing of foods using fermentation technique, i.e. preparation of sauerkraut	04
8	Study on effect of high pressure on microbe; Study on effect of pulse electric field on food.	04

Name of the Course : On – Job- Training									
Course Code :OJT-01					Semester- I				
Duration :150 hrs					Maximum Marks :200				
Credit :15									
Unit .No	Contents			Mark distribution					Credit
1.	OJT-Baking Technician/ Assistant Lab Technician			OJT Marks by the SKP		OJT Credits		VIVA	15
Course code	Subjects	No of Hours /Week		Total Hours /semester		Total Marks		Exam Duration	
Total Marks of University				200					
						EXT	IC		
				T	P				
B.V.FP-07	Food Processing Technology-1	5	-	50	3	40	10	2	
B.V.FP-08	Food Science & Nutrition	5	-	50	3	40	10	2	
B.V.FP-09	Dairy Technology	5	-	50	3	40	10	2	
B.V.FP-10	Food Chemistry	5	-	50	3	40	10	2	
Lab/Practical									
B.V.FP-11	Food Processing Technology-1	-	4	50	1.5	40	10	3	
B.V.FP-12	Traditional Indian Dairy Products Lab	-	4	50	1.5	40	10	3	
On-Job-Training(OJT)									
Biscuit Production Specialist/ Dairy Product Processor				150		15		200	
Total		20	8	450		30		440	60
Total marks of University		E		IC		Total		500	
		160	280	40	20				
		440		60					

**Bachelor of Vocation (B.Voc) in Food Processing
Proposed Syllabus
Second semester syllabus**

Name of the Course : FOOD PROCESSING TECHNOLOGY-1			
Course Code :B.V.FP-07		Semester- II	
Duration :75 hrs		Maximum Marks :50	
Teaching Scheme		Examination Scheme	
Theory : 5hrs /week		CE/IC Mark:10 Marks	
Credit :3		End Semester Exam : 40 Marks	
Unit No	Contents	Hrs	WEIG HTAGE
1	Status of food processing industries in India and abroad, magnitude and inter- dependence of dairy and food industry, prospects for future growth in India.	12	15%
2	Harvesting, transportation and storage of fruits and vegetables. Post harvest processing of fruits and vegetables: Peeling, sizing, blanching, Canning of fruits and vegetables, Drying and freezing of fruits and vegetables.	13	10%
3	Juice processing: General steps in juice processing, role of enzymes in fruit. Juice extraction, equipment's and methods of fruit juice extraction, preservation of fruit juices, fruit juice clarification, concentration of fruit juices, fruit juice powders. Fruit juice processing; Orange and tangerine, Lemon and lime juice, Apple juice, Grape juice, Nectars, pulpy juices, tropical blends, Vegetable juices.	15	25%
4	Manufacture of Jam, Jelly and Marmalade: Role played by pectin, sugar and acid in jellied fruit products. Fruits and vegetable preserves, Glazed, Crystallized fruits. Tomato based	20	10%

	products: Juice, puree, paste, sauce, ketchup. Pickles: Principle of pickling, technology of pickles.		
5	Beverages: Classification, scope, carbonated non-alcoholic beverages and their manufacture. Fruit beverages and drinks, additives for fruit based beverages. Coffee: Production practices, structure of coffee/cherry, Coffee processing including roasting, grinding, brewing extraction, dehydration, aromatization, instant coffee. Tea: Tea leaf processing, green, red, yellow, instant tea.	15	40%

B.V.FP-08- FOOD SCIENCE & NUTRITION

Aim of the course: To understand the nutrient composition of foods, their functions, sources and to impart knowledge of concept of good health and its importance.

Course Overview and Context

. To know and understand the functions, importance of all nutrients present in foods.

. To know about the various types of nutrients and their functions in the body.

. To familiarize with the recent advances in field of nutrition

. To understand the different types of newly developed food products.

Name of the Course : FOOD SCIENCE & NUTRITION			
Course Code :B.V.FP-08		Semester- II	
Duration :75 hrs		Maximum Marks :50	
Teaching Scheme		Examination Scheme	
Theory : 5hrs /week		CE/IC Mark:10 Marks	
Credit :3		End Semester Exam : 40 Marks	
Unit No	Contents	Hrs	WEIG HTAGE
1	Introduction to Nutrition Definition of nutrition and health, inter-relationship between nutrition and health. Malnutrition: Definition and types. Reference man and reference women.	15	15%
2	Food and water Definition of food, classification of foods based on origin, pH, nutritive value. Basic five food groups, food guide pyramid. Functions of foods. New concepts of food:	15	10%

	health foods, ethnic foods, organic foods, functional foods, nutraceuticals, fabricated foods, extruded foods, convenience foods, junk foods, GM foods and proprietary foods. Water: functions, sources, requirement, water balance, toxicity and deficiency.		
3	Vitamins Classification, structure, function, sources, general causes for loss in foods, bioavailability, enrichment, fortification and restoration. Units of measurement. Deficiency and toxicity disorders	15	25%
4	Minerals Classification of minerals. Functions, sources, bioavailability and deficiency of the following minerals- Calcium, Iron, Iodine, Fluorine, Sodium, Potassium.	15	10%
5	Energy Units of energy, food as a source of energy, basal metabolic rate, factors effecting BMR, total energy Requirement.	15	40%

Reference Books

1. James L Groff and Sareen S Gropper, (2009) "Advanced Nutrition and Human Metabolism", Fourth Edition, Wadsworth Publishing Company.
2. Maurice B Shils, Moshe Shike A, Catherine Ross, Benjamin Cabellero, Robert J Cousins, (2006), "Modern Nutrition in Health and Disease", Lippincott Williams al Wilkins.
3. Michael J Gibney, Ian A Macdonald and Helen M Roche (2003) "Nutrition and Metabolism", The Nutrition Society Textbook Series, Blackwell Publishing, First Edition.

B.V.FP-09- DAIRY TECHNOLOGY

Aim of the course: To inculcate the knowledge regarding various dairy products and its processing techniques.

Course Overview and Context

- . To understand about the products that can be made from milk.
- . To understand the processing and storage of dairy products.
- . To know about the quality control measures applied in dairy industries.
- . To have a basic idea about their processing and products which can be made at a small scale

Name of the Course : DAIRY TECHNOLOGY			
Course Code :B.V.FP-09		Semester- II	
Duration :75 hrs		Maximum Marks :50	
Teaching Scheme		Examination Scheme	
Theory : 5hrs /week		CE/IC Mark:10 Marks	
Credit :3		End Semester Exam : 40 Marks	
Unit No	Contents	Hrs	WEIG HTAGE
1	Introduction Milk - Definition, sources, and composition of milk, factors effecting composition of milk, physiochemical properties of milk, grading of milk-definition and types of grades, collection and transportation of milk.	15	15%
2	Processing of market milk Flowchart of milk processing, Reception, Different types of cooling systems. Clarification and filtration process, standardization- Pearson's square method, pasteurization-LTLT, HTST and UHT process-continuous pasteuriser, Sterilisation and Homogenisation, Cream	20	10%

	separation- centrifugal cream separator, bactofugation.		
3	Special milks Skim milk, evaporated milk, condensed milk, standardized milk, toned milk, doubletoned milk, flavoured milk, reconstituted milk.	15	25%
4	Indigenous and Fermented milk products Product description, methods for manufacture of butter, cheese, ice cream, Khoa, Channa, paneer, Shrikhand, ghee. Spray drying system: dried milk- whole milk and skim milk powder. Instantization of milk.	10	10%
5	In-Plant cleaning system Introduction to Cleaning in- place (CIP) system - cleaning procedure, Cleaning efficiency, Methods of cleaning in food industry, cleaning solutions – Detergents, Sanitizers. SIP system of dairy plant, Personal hygiene in dairy plant.	15	40%

References

1. Joshi.V.K. (2015), "Indigenous Fermented Foods of South Asia", CRC Press.
2. Alan H. Varnam, (2012), "Milk and Milk Products: Technology, chemistry and microbiology", Springer Science & Business Media Publishers.
3. Robinson, R. K., (2012), "Modern Dairy Technology: Volume 2 Advances in Milk Products", Springer Science & Business Media Publishers.

B.V.FP-10- FOOD CHEMISTRY

Aim of the course: To explain the chemical composition and functional properties of food.

Course Overview and Context

- To study about the major and minor components of food and their properties
- To know about the changes that occurs in foods during processing.
- To study the classification, structure and chemistry of the various food components.
- To understand the changes that occurs in the different constituents during storage and ways and means to prevent it.

Name of the Course : FOOD CHEMISTRY			
Course Code :B.V.FP-10		Semester- II	
Duration :75 hrs		Maximum Marks :50	
Teaching Scheme		Examination Scheme	
Theory : 5hrs /week		CE/IC Mark:10 Marks	
Credit :3		End Semester Exam : 40 Marks	
Unit No	Contents	Hrs	WEIG HTAGE
1	Water Introduction to food chemistry, structure of water molecule, hydrogen bonding, effect of hydrogen bonding on the properties of water, moisture in foods, free water, boundwater, water activity, estimation of moisture in foods, determination of moisture and water activity.	15	15%
2	Carbohydrates Nomenclature, composition, sources, structure, reactions, functions, classification - monosaccharide, disaccharides, oligosaccharides and polysaccharides. Properties of Starch – gelatinisation, gel formation, syneresis, starch degradation, dextrinisation, retrogradation, Qualitative and quantitative tests of carbohydrates.	20	10%
3	Proteins	15	25%

	Nomenclature, sources, structure, functions, classification - essential and nonessential amino acids, Physical and chemical properties of proteins and amino acids, functional properties - denaturation, hydrolysis, changes in proteins during processing. Enzymes - Specificity, mechanism of enzyme action, factors influencing enzymatic activity, controlling enzyme action, enzymes added to food during processing, enzymatic browning.		
4	Fats and oils Nomenclature, composition, sources, structure, functions, classification, essential fatty acids. Physical and chemical properties - hydrolysis, hydrogenation, rancidity and flavour reversion, emulsion and emulsifiers, saponification value, acid value and iodine value, smoke point.	10	10%
5	Pigments, colours and flavours in food Micro nutrients: Vitamins and minerals, Pigments indigenous to food, structure, chemical and physical properties, effect of processing and storage, colours added to foods, flavours-vegetable, fruit and spice flavours, flavours of milk and meat products, effect of processing on flavour components.	15	40%

Reference Books:

1. Yildiz, Fatih (2009), "Advances in Food Biochemistry", CRC Press, New York.
2. Damodaran, S., Parkin, K L., Fennema, O R., (2008), "Fennema's Food Chemistry"- 4th edition, CRC press, New York
3. Campbell, M K and Farrell, S O (2006), "Biochemistry", 5th edition, Cengage Learning Publishers, USA.
4. Manay, N.S. Shadaksharaswamy, M. (2004), "Foods- Facts and Principles", New age international publishers, New Delhi.
5. Meyer, L.H. (2002), "Food Chemistry". CBS publishers and Distributors, New Delhi.

B.V.FP-11 -FOOD PROCESSING TECHNOLOGY-1 LAB

Name of the Course : FOOD PROCESSING TECHNOLOGY-1 LAB		
Course Code :B.V.FP-11		Semester- II
Duration :32hrs		Maximum Marks :50
Teaching Scheme		Examination Scheme
Practical : 4hrs /week		CE/IC Mark:10 Marks
Credit :1.5		End Semester Exam : 40 Marks
Unit .No	Contents	Hours
1.	Manufacture of barley malt. Determination of cooking quality of rice.	04
2	Preparation of noodles.	04
3	Manufacture of potato chips.	04
4	Preparation of malt based food products. Manufacture of malted milk foods.	04
5	Manufacture of soy beverage and tofu.	04
6	Preparation of salami.	04
7	Preparation of chicken soup.	04
8	Manufacture of chicken pickle.	04

B.V.FP-12- TRADITIONALINDIAN DAIRY PRODUCTS LAB

Name of the Course : TRADITIONALINDIAN DAIRY PRODUCTS LAB		
Course Code :B.V.FP-12		Semester- II
Duration :32hrs		Maximum Marks :50
Teaching Scheme		Examination Scheme
Practical : 4hrs /week		CE/IC Mark:10 Marks
Credit :1.5		End Semester Exam : 40 Marks
Unit .No	Contents	Hours
1.	Preparation of Khoa from cow buffalo and concentrated milk.	04
2	Preparation of Burfi, Peda, Kalakand, Milk cake and Gulabjamun	04
3	Preparation of Paneer from cow, buffalo and mixed milk	04
4	Preparation of Channa from cow and buffalo milk and mixed milk	04
5	Preparation of Sandesh and Rasagolla	04
6	Preparation of kheer	04
7	Preparation of Rabri, Misti Dahi, Chhaka and Shrikhand	04
8	Visit to industry	04

OJT-02- On – Job- Training

Name of the Course : On – Job- Training					
Course Code :OJT-02		Semester- II			
Duration :150 hrs		Maximum Marks :200			
Credit :15					
Unit .No	Contents	Mark distribution			Credit
1.	OJT- Biscuit Production Specialist /Dairy Product Processor	OJT Marks by the SKP	OJT REPORT	VIVA	15
		100	50	50	
Total Marks of University		200			

Course code	Subjects	Bachelor of Vocation (B.Voc) in Food Processing							Exam Duration
		Proposed Syllabus					Total Marks		
		No of Hours /Week	P	Total hours	Credits	EXT	IC		
Third semester syllabus									
B.V.FP-13	Sensory Evaluation of Foods	5	-	50	3	40	10	2	
B.V.FP-14	Food Packaging Technology	5	-	50	3	40	10	2	
B.V.FP-15	Processing of Meat, Poultry & Fish Products	5	-	50	3	40	10	2	
B.V.FP-16	Entrepreneurship Development	5	-	50	3	40	10	2	
Lab/Practical									
B.V.FP-17	Food Processing Technology & Sensory Evaluation	-	4	50	1.5	40	10	3	
B.V.FP-18	Food Quality Analysis	-	4	50	1.5	40	10	3	
On-Job-Training(OJT)									
Pickle Making Technician /Jam, Jelly & Ketchup Processing				150	15	200			
Total		20	8	450	30	440	60		
Total marks of University		E		IC		Total			
		160	280	40	20	500			
		440		60					

B.V.FP-13- SENSORY EVALUATION OF FOODS

Aim of the course: The course provides knowledge about Sensory test methods and procedures used to evaluate the flavour, color and texture of foods which helps to enhance acceptance of a product.

Course Overview and Context

- To study the appropriate sensory evaluation tests related to the sensory quality of foods.
- To understand the relationship between sensory and instrumental methods for the evaluation of food quality.
- To acquire knowledge on statistical methods for sensory evaluation.

Name of the Course : SENSORY EVALUATION OF FOODS			
Course Code :B.V.FP-13		Semester- III	
Duration :75 hrs		Maximum Marks :50	
Teaching Scheme		Examination Scheme	
Theory : 5hrs /week		CE/IC Mark:10 Marks	
Credit :3		End Semester Exam : 40 Marks	
Unit No	Contents	Hrs	WEIG HTAGE
1	Introduction Definition of sensory evaluation; basic tastes; human senses and sensory perception; threshold; psychophysics, Tongue surface	15	15%
2	Arrangements for Sensory Evaluation Test controls Environment and test room design; product controls: sample preparation and presentation; panellist controls; factors influencing measurements: psychological and physiological errors	20	10%
3	Statistical Methods for Sensory Evaluation Classification of test methods; discrimination tests: paired-comparison, duo-trio and triangle tests; affective tests: qualitative (interview and focus group) and quantitative tests (paired preference and acceptance tests); Two sample test, Ranking test, Twosample difference test, numeric scoring	15	25%

	test, hedonic ranking test		
4	Subjective and objective methods Texture analyser- mechanical characteristics- chewiness, brittleness, and geometric characteristics, Sensory panel-types- criteria for panel selection	10	10%
5	Applications of Sensory Analysis in the Food Industry Quality control; storage stability testing; product development and consumer acceptance testing	15	40%

References

1. Herbert Stone, Joel L. Sidel, (2012), "Sensory Evaluation Practices", Academic Press Publishers.
2. Maynard A. Amerine, Rose Marie Pangborn, Edward B. Roessler, (2013), "Principles of Sensory Evaluation of Food", Elsevier Publications.
3. Harry T. Lawless, Hildegarde Heymann, (2010), "Sensory Evaluation of Food: Principles and Practices", Springer Science & Business Media.

B.V.FP-14- FOOD PACKING TECHNOLOGY

Name of the Course : FOOD PACKING TECHNOLOGY			
Course Code :B.V.FP-14		Semester- III	
Duration :75 hrs		Maximum Marks :50	
Teaching Scheme		Examination Scheme	
Theory : 5hrs /week		CE/IC Mark:10 Marks	
Credit :3		End Semester Exam : 40 Marks	
Unit No	Contents	Hrs	WEIG HTAGE
1	Factors affecting shelf life of food material during storage, Interactions of spoilage agents with environmental factors as water, oxygen, light, pH, etc. and general principles of control of the spoilage agents; Difference between food infection, food intoxication and allergy.	15	15%
2	Packaging of foods, requirement, importance and scope, frame work of packaging strategy, environmental considerations, Packaging systems, types: flexible and rigid; retail and bulk; levels of packaging ;special solutions and packaging machines, technical packaging systems and data management packaging systems,	20	10%
3	Different types of packaging materials, their key properties and applications, Metal cans, manufacture of two piece and three piece cans, Plastic packaging, different types of polymers used in food packaging and their barrier properties. manufacture of plastic packaging materials, profile extrusion, blown film/ sheet extrusion, blow moulding, extrusion blow moulding, injection blow moulding, stretch blow moulding, injection moulding.	15	25%
4	Glass containers, types of glass used in food packaging, manufacture of glass and glass containers, closures for glass containers. Paper and paper board packaging, paper and paper board manufacture process, modification of barrier properties and characteristics of paper/ boards.	10	10%
5	Relative advantages and disadvantages of different packaging materials; effect of these materials on packed commodities. Nutritional labelling on packages, CAS and MAP, shrink and cling	15	40%

	<p>packaging, vacuum and gas packaging ;Active packaging, Smart packaging, Packaging requirement for raw and processed foods, and their selection of packaging materials, Factors affecting the choice of packaging materials, Disposal and recycle of packaging waste, Printing and labelling, Lamination, Package testing: Testing methods for flexible materials, rigid materials and semi rigid materials; Tests for paper(thickness, bursting strength, breaking length, stiffness, tear resistance, folding endurance, plybond test, surface oil absorption test, etc.), plastic film and laminates (thickness, tensile strength, gloss, haze, burning test to identify polymer, etc.), aluminium foil (thickness, pin holes, etc.), glass containers (visual defects, colour, dimensions, impact strength, etc.), metal containers (pressure test, product compatibility, etc.).</p>		
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B.V.FP-15- PROCESSING OF MEAT, POULTRY & FISH PRODUCTS

Aim of the course: To understand the technology for handling, processing, preservation of meat, poultry and fish products.

Course Overview and Context

To understand need and importance of livestock, egg and poultry industry

To study structure, composition and nutritional quality of animal products.

To study processing and preservation of animal foods.

To understand technology behind preparation of various animal food products and by product utilization

Name of the Course : PROCESSING OF MEAT, POULTRY & FISH PRODUCTS			
Course Code :B.V.FP-15		Semester- III	
Duration :75 hrs		Maximum Marks :50	
Teaching Scheme		Examination Scheme	
Theory : 5hrs /week		CE/IC Mark:10 Marks	
Credit :3		End Semester Exam : 40 Marks	
Unit No	Contents	Hrs	WEIG HTAGE
1	Sources and importance of meat and poultry; Status of Meat and poultry industry in India; Pre slaughter operations and slaughtering operations for animals and poultry; Evaluation of animal carcasses; Factors affecting post-mortem changes, properties and shelf life of meat; Mechanical deboning, grading and aging; Eating and cooking quality of meat; Preservation of meat by chilling ,freezing, pickling, curing, cooking and smoking, dehydration, radiation, chemical and biological preservatives;	15	15%
2	Meat tenderization; Meat emulsions; Meat cutting and handling; Preparation, preservation and equipment for manufacture of smoked meat and its quality evaluation; Preparation, packaging and equipment for manufacture of dehydrated meat products and their quality evaluation; Preparation, preservation and equipment for manufacture of meat sausages and their quality evaluation; Abattoir design and layout	20	10%
3	Sources and importance of poultry; Status of poultry industry in India; Pre slaughter operations and slaughtering operations for poultry; Eggs: Structure, composition, quality characteristics,	15	25%

	processing, preservation of eggs; Processing and preservation of poultry meat and chicken patties; By-products of poultry and eggs and their utilization. Safety standards in meat industry: HACCP/ISO/MFPO/FSSAI/Kosher/Halal.		
4	Fisheries resources, global and Indian scenario; Types of fish and other marine products; Classification of fish (fresh water and marine), composition of fish, characteristics of fresh fish, spoilage of fish- microbiological, physiological, biochemical; Relationship between chilling and storage life, MAP, general aspects of fish freezing, changes in quality during chilled and frozen storage	10	10%
5	Principles of canning, effect of heat processing on fish, storage of canned fish, pre-process operations, post-process operations, cannery operations for specific canned products ;Fish products: Introduction, fish muscle proteins, surimi process, traditional and modern surimi production lines, quality of surimi products, comparison of surimi and fish mince products; Fish protein concentrates (FPC), fish protein extracts (FPE), fish protein hydrolysates (FPH);Preparation protocols of indigenous products: Fish sauce and paste. Novel methods; Low dose irradiation; High pressure treatment, MAP, vacuum packaging, gas packaging; Oxygen absorbents and CO2 generators, ethanol vapour generation, hurdle barrier concept, value added fish products, packaging.	15	40%

Reference

1. George M. Hall (2012), "Fish Processing Technology", Springer Science & Business Media Publication.
2. Fidel Toldra (2010), "Handbook of Meat Processing", John Wiley & Sons Publication.
3. Rao D.G. (2010), "Fundamentals of food engineering". PHI Learning Pvt. Ltd.
4. Isabel Guerrero-Legarreta (2010), "Handbook of Poultry Science and Technology, Secondary Processing", John Wiley and Sons Publication.
5. Casey M. Owens. (2010), "Poultry Meat Processing", Second Edition, CRC Press.
6. Leo M.L. Nollet and Fidel Toldra (2006), "Advanced Technologies for Meat Processing", CRC Press.

B.V.FP-16-ENTREPRENEURSHIP DEVELOPMENT

Aim of the course: To develop Entrepreneurial culture and encourage the students to become entrepreneurs.

Course Overview and Context

To know about the various procedures for starting a small scale unit of production.

To have a basic idea about how to prepare a project to start a small scale industry.

To know about various agencies that can provide assistance for starting a new project.

Name of the Course :ENTREPRENEURSHIP DEVELOPMENT			
Course Code :B.V.FP-16		Semester- III	
Duration :75 hrs		Maximum Marks :50	
Teaching Scheme		Examination Scheme	
Theory : 5hrs /week		CE/IC Mark:10 Marks	
Credit :3		End Semester Exam : 40 Marks	
Unit No	Contents	Hrs	WEIGHTAGE
1	Introduction to Entrepreneurship Meaning, definition and concepts, characteristics, functions, entrepreneurial traits and motivation, role of entrepreneur in economic development, factors affecting entrepreneurial growth. Types of entrepreneurs - Entrepreneurship, Women entrepreneurship, significance, problems, solutions to the problems	15	15%
2	Entrepreneurial Development Programme Objectives, Steps, Need for training- target group- Contents of the training programme-Special Agencies for Entrepreneurial Development and Training-DIC.	20	10%
3	Project Meaning, Features, Classification, Project identification, Stages in project identification, Project Life Cycle, Project formulation-Elements, Feasibility Analysis-Network Analysis-Project Planning.	15	25%
4	Setting up of micro small and medium enterprises Government schemes and incentives for promotion of entrepreneurship; Government policy on small and medium enterprises (SMEs)/SSIs; Setting up of micro small and medium	10	10%

	enterprises, location significance, Green channel, Bridge capital, Seed capital assistance, Margin money scheme, Sickness, Causes-Remedies.		
5	<p>Role of institutions/schemes in entrepreneurial development</p> <p>Export and import policies relevant to food processing sector; Venture capital; Contract farming and joint ventures, public-private partnerships; Overview of food industry inputs; Characteristics of Indian food processing industries and export; Social responsibility of business.</p> <p>SIDCO, SIDBI, NIESBUD, EDII, SISI, NREG Scheme- SWARNA JAYANTHI, RozgarYojana Schemes.</p>	15	40%

Reference Books

1. Drucker, Peter (2014), "Innovation and Entrepreneurship", Routledge Publishers.
2. Abraham M.M, (2010), "Entrepreneurship Development and Project Management", Prakash Publications and Printers.
3. Desai, Vasant (2001), "Dynamics of entrepreneurial development and management". Himalaya Publishing House.

Name of the Course :		
FOOD PROCESSING TECHNOLOGY & SENSORY EVALUATION LAB		
Course Code :B.V.FP-17	Semester- III	
Duration :32hrs	Maximum Marks :50	
Teaching Scheme	Examination Scheme	
Practical : 4hrs /week	CE/IC Mark:10 Marks	
Credit :1.5	End Semester Exam : 40 Marks	
Unit .No	Contents	Hours
1.	Manufacture of toffees and caramels, testing the efficacy of blanching process, Drying of fruits and vegetables, Preparation of fruit based drinks and beverages: Ready-to-serve drink, Nectar, Squash, Whey-fruit based beverages.	04
2	Manufacture of fruit jam. Manufacture of fruit jelly. Manufacture of chocolate confections.	04
3	Manufacture of tomato ketchup/tomato sauce. Manufacture of soups. Manufacture of fruit preserve. Manufacture of candied fruits. Manufacture of fruit bar	04
4	Manufacture of pickles.	04
5	Determination of threshold value for basic tastes; Odour recognition, difference (PC, Duo trio, triangle); Determination of threshold value for various odours; Selection of judging panel	04
6	Training of judges, for recognition of certain common flavour and texture defects using different types of sensory tests	04
7	Descriptive analysis methodology; Sensory evaluation of various food products using different scales, score cards and tests; Texture profile methodology; Estimation of color	04
8	Relationship between objective and subjective methods; Designing a sensory laboratory.	04

B.V.FP-18- FOOD QUALITY ANALYSIS LAB

Name of the Course :FOOD QUALITY ANALYSIS LAB		
Course Code :B.V.FP-18		Semester- III
Duration :32hrs		Maximum Marks :50
Teaching Scheme		Examination Scheme
Practical : 4hrs /week		CE/IC Mark:10 Marks
Credit :1.5		End Semester Exam : 40 Marks
Unit .No	Contents	Hours
1.	Examination of cereals & pulses from one of go-downs and market shops in relation to FPO and BIS specifications,	04
2	Detection of adulteration and examination of ghee for various standards of AGMARK & BIS standards,	04
3	Detection of adulteration and examination of spices for AGMARK and BIS standards,	04
4	Detection of adulteration and examination of milk and milk products for BIS standards,	04
5	Detection of adulteration and examination of fruit products such as jams, jellys, marmalades for FPO specification,	04
6	Study of registration process and licensing procedure under FSSAI.	04
7	Study of sampling techniques from food processing establishments.	04
8	Visit to food processing laboratory and study of records and reports maintained by food processing laboratory.	04

OJT-03- On – Job- Training

Name of the Course : On – Job- Training					
Course Code :OJT-03			Semester- III		
Duration :150 hrs			Maximum Marks :200		
Credit :15					
Unit .No	Contents	Mark distribution			Credit
1.	OJT- Pickle Making Technician/Jam, Jelly & Ketchup processing	OJT Marks by the SKP	OJT REPORT	VIVA	15
		100	50	50	
Total Marks of University		200			

Bachelor of Vocation (B.Voc) in Food Processing

Proposed Syllabus

Course code	Subjects	Fourth semester syllabus				Total Marks		Exam Duration
		No of hours /Week		Total hours /semester	Credits	EXT	IC	
		T	P					
B.V.FP-19	Ice cream & Frozen Deserts	5	-	50	3	40	10	2
B.V.FP-20	Food Plant Layout	5	-	50	3	40	10	2
B.V.FP-21	Technology of Beverages	5	-	50	3	40	10	2
B.V.FP-22	Food Processing Equipments	5	-	50	3	40	10	2
Lab/Practical								
B.V.FP-23	Ice cream & Frozen Deserts	-	4	50	1.5	40	10	3
B.V.FP-24	Food Plant Layout	-	4	50	1.5	40	10	3
On-Job-Training(OJT)								
Ice Cream Technician/Plant Biscuit Production Specialist				150	15	200		
Total		20	8	450	30	440	60	
Total marks of University		E		IC		Total		
		160	280	40	20	500		
		440		60				

B.V.FP-19- ICE CREAM & FROZEN DESSERTS

Name of the Course :ICE CREAM & FROZEN DESSERTS

Course Code :B.V.FP-19 Semester- IV

Duration: 75hrs

Maximum Marks :50

Teaching Scheme

Examination Scheme

Theory : 5hrs /week

CE/IC Mark:10 Marks

Credit :3

End Semester Exam : 40 Marks

Unit No	Contents	Hrs	WEIGHTAG E
1	History, development and status of ice cream industry	15	15%
2	Definition, classification and composition and standards of ice cream and other frozen desserts, Stabilizers and emulsifiers-their classification, properties and role in quality of ice cream, Technological aspects of ice cream manufacture	20	10%
3	Thermodynamics of freezing and calculation of refrigeration loads, Types of freezers, refrigeration control / instrumentation, Types of freezers, refrigeration control / instrumentation, Hygiene, cleaning and sanitation of ice cream plant,	15	25%
4	Effect of process treatments on the physic-chemical properties of ice-cream mixes and ice cream, Processing and freezing of ice-cream mix and control of over run,	10	10%
5	Packaging, hardening, storage and shipping of ice-cream, Defects in ice cream, their causes and prevention, Recent advances in ice-cream industry (flavourings, colourings, fat replacers, bulking agents) and plant management, Nutritive value of ice-cream.	15	40%

Name of the Course: FOOD PLANT LAYOUT

Aim of the course: To study design of plant and processing unit and to get a thorough knowledge about the importance of a good food plant design.

Course Overview and Context

- To understand concepts of plant layout.
- To have knowledge on building, utilities in the plant.
- To know the importance of proper food plant design and safety.

Name of the Course :FOOD PLANT LAYOUT

Course Code :B.V.FP-20 Semester- IV

Duration :75 hrs Maximum Marks :50

Teaching Scheme Examination Scheme

Theory : 5hrs /week CE/IC Mark:10 Marks

Credit :3 End Semester Exam : 40 Marks

Unit No	Contents	Hrs	WEIGHTAGE
1	Introduction Definition, Basic concepts of plant layout and design with special reference to food process industries. Application of HACCP concept, ISO, FPO & MPO requirements in food plant layout and design.	15	25%
2	Plant Location Influence of location on plant layout, location factors, location theory and models, Economic plant size, types of manufacturing processes like continuous, repetitive and intermittent processes.	20	20%
3	Plant Layout Preparation of a Plant Layout, Plant Layout problem, importance, objectives, classical types of layouts. Evaluation of layout. Advantages of good layout	15	25%
4	Plant Building Considerations in building design, type of factory buildings, choice of building construction, material for floors, foundation, walls, doors, windows, drains etc., ventilation, fly control, mold prevention and illumination in food processing industries.	10	20%
5	Plant layout & Equipment Layout	15	10%

Plant layout and design of bakery and biscuit industries; fruits and vegetables processing industries including beverages; milk and milk products; meat, poultry and fish processing industries.

Reference Books

1. John Holah, H. L. M. Lelieveld, (2011), "Hygienic Design of Food Factories", Elsevier Publication.
2. J. Peter Clark, (2008), "Practical Design, Construction and Operation of Food Facilities", Academic Press Publishers.
3. Zacharias B. Maroulis, George D. Saravacos, (2007), "Food Plant Economics", CRC Press Publishers.
4. Antonio Lopez-Gomez, Gustavo V. Barbosa-Canovas, (2005), "Food Plant Design", CRC Press Publishers.

B.V.FP-21- TECHNOLOGY OF BEVERAGES

Course Overview and Context

- To study about the various beverages.
- To study about the products made out of them.
- To provide a technical view of beverages.
- To understand the manufacturing processes in the context of technology.

Name of the Course :TECHNOLOGY OF BEVERAGES
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Course Code :B.V.FP-21		Semester- IV	
Duration :75 hrs		Maximum Marks :50	
Teaching Scheme		Examination Scheme	
Theory : 5hrs /week		CE/IC Mark:10 Marks	
Credit :3		End Semester Exam : 40 Marks	
Unit No	Contents	Hrs	WEIGHTAGE
1	Introduction to beverages Types of beverages and their importance, status of beverage industry in India, Manufacturing technology for juice-based beverages, synthetic beverages; technology of still, carbonated, low-calorie and dry beverages, isotonic and sports drinks; role of various ingredients of soft drinks, carbonation of soft drinks.	15	25%
2	Manufacturing process of beverages Beverages based on tea, coffee, cocoa, spices, plant extracts, herbs, nuts, Dairy-based beverages.	20	20%
3	Types of coffee and tea Chemical composition and processing of tea and coffee and their quality assessment. Types of tea: black tea, green tea, oolong tea. Types of coffee: Vacuum coffee, drip coffee, iced coffee. Espresso coffee, instant coffee. Decaffeination of Coffee types of decaffeination: Roselius method, swiss water process, direct and indirect method, triglyceride method, carbon dioxide method.	15	25%
4	Alcoholic beverages 15 Hours Types, manufacture and quality evaluation; the role of yeast in beer and other alcoholic beverages, ale type beer, lager type beer, technology of brewing process, equipments used for brewing and distillation, wine and related beverages, distilled spirits.	10	20%
5	Packaged drinking water Definition, types, manufacturing processes, quality evaluation and raw and processed water, methods of water treatment, BIS quality standards of bottled water; mineral water, natural spring water, flavoured water, carbonated water.	15	10%

Reference Books

1. Manay, N.S, Shandaksharaswamy, M., (2004), "Foods- Facts and Principles", New Age International Publishers, New Delhi,
2. Potter, N.N, Hotchkiss, J.H. (2000), "Food Science". CBS Publishers, New Delhi.
3. Srilakshmi, B. Food Science (3rd Edition) (2003), New Age International (p) Limited Publishers, New Delhi,
4. Nicholas Dege. (2011), "Technology of Bottled water". Blackwell publishing Ltd, UK.

B.V.FP-22-FOOD PROCESSING EQUIPMENTS

Aim of the course: To introduce basic equipment design and various control mechanisms.

Course Overview and Context

To enable the student to design and develop equipments used in Food Processing Operations.

To identify and discuss critical design of typical processing equipment.
To Understand the relationship between process design and Safety

Name of the Course :FOOD PROCESSING EQUIPMENTS			
Course Code :B.V.FP-22		Semester- IV	
Duration :75 hrs		Maximum Marks :50	
Teaching Scheme		Examination Scheme	
Theory : 5hrs /week		CE/IC Mark:10 Marks	
Credit :3		End Semester Exam : 40 Marks	
Unit No	Contents	Hrs	WEIGHTAGE
1	Introduction to equipments used in food industry Equipments: Types, planning, factors affecting selection and purchase	15	25%
2	Mechanical Equipments Transport equipments: Fluid food transport equipment, mechanical conveyors. Storage equipments: Solid and liquid food storage equipments. Processing equipments: Size reduction, homogenization, mixing and foaming equipments. Separation equipments: Grading and sorting equipments.	20	20%
3	Heat exchangers, dryers and evaporators Heat transfer equipments: Heat exchangers. Food evaporation equipments: food evaporators, evaporator components. Food dehydration equipments – Food dehydration principle, food dryers, hygiene and safety considerations.	15	25%
4	Refrigeration and thermal processing equipments Refrigeration and freezing equipments: Refrigerants, freezers, chillers. Thermal processing equipments: sterilizers, pasteurizers, blanchers.	10	20%
5	Food packaging Equipments Introduction, preparation of food containers, filling equipments, closing equipments, group packaging.	15	10%

B.V.FP-23-ICE CREAM & FROZEN DESERTS LAB

Name of the Course : ICE CREAM & FROZEN DESERTS LAB	
Course Code :B.V.FP-23	Semester- IV
Duration :32hrs	Maximum Marks :50
Teaching Scheme	Examination Scheme

Practical : 4hrs /week		CE/IC Mark:10 Marks
Credit :1.5		End Semester Exam : 40 Marks
Unit .No	Contents	Hours
1.	Calculation of standardization of ice-cream mixes.	04
2	Manufacture of plain and fruit flavour ice-cream.	04
3	Manufacture of chocolate, fruit and nut ice cream.	04
4	Preparation of sherbets/ices .Preparation of soft served and filled ice-cream.	04
5	Manufacture of kulfi.	04
6	Study of continuous and batch type freezers.	04
7	Manufacture of ice-cream by continuous process. Determination of over run in ice cream.	04
8	Factory visit.	04

B.V.FP-24-FOOD PLANT LAYOUT LAB

Name of the Course : FOOD PLANT LAYOUT LAB	
Course Code :B.V.FP-24	Semester- IV
Duration :32hrs	Maximum Marks :50
Teaching Scheme	Examination Scheme
Practical : 4hrs /week	CE/IC Mark:10 Marks

Credit :1.5		End Semester Exam : 40 Marks
Unit .No	Contents	Hours
1.	Preparation of project report, Preparation of feasibility report	04
2	Salient features and layout of pre-processing house	04
3	Salient features and layout of Milk and Milk product plants, Evaluation of given layout	04
4	Salient features, design and layout of modern rice mill	04
5	Salient features, design and layout of Bakery and related product plant	04
6	Study of different types of records relating to production of a food plant, Study of different types of records relating to finance of a food plant.	04
7	Study of different types of records relating to marketing of a food business	04
8	Brain storming and SWOT analysis to start a food processing business.	04

OJT-04- On – Job- Training

Name of the Course : On – Job- Training	
Course Code :OJT-04	Semester- IV
Duration :150 hrs	Maximum Marks :200

Credit :15								
Unit .No	Contents			Mark distribution				Credit
1.	Ice Cream Technician/Plant Biscuit Production Specialist			OJT Marks by the SKP	OJT REPORT	VIVA		15
Course code	Subjects	No of Hours /Week		Total hours /semester	Credit	Total Marks		Exam Duration
Total Marks of University				100	5	50	50	
		T	P			EXT	IC	
B.V.FP-25	By product utilization	5	-	50	3	40	10	2
B.V.FP-26	Energy conservation &Management	5	-	50	3	40	10	2
B.V.FP-27	Food Quality,	5	-	50	3	40	10	2

Bachelor of Vocation (B.Voc) in Food Processing

Proposed Syllabus

Fifth semester syllabus

	Safety & certification							
B.V.FP-28	Food plant Sanitation	5	-	50	3	40	10	2
Lab/Practical								
B.V.FP-29	By product utilization	-	4	50	1.5	40	10	3
B.V.FP-30	Traditional Indian Dairy products	-	4	50	1.5	40	10	3
On-Job-Training(OJT)								
Traditional Snack and savory Maker/Fish & Sea Food Processing Technician				150	15	200		
Total		20	8	450	30	440	60	
Total marks of University		E		IC		Total		
		160	280	40	20	500		
		440		60				

B.V.FP – 25- BY PRODUCT UTILIZATION

Aim of the course: To understand about the ways for effective utilisation of the by products obtained after food processing and also to gain knowledge about characterisation of waste products and effluent treatment methods.

Course Overview and Context

- To identify types of wastes in food industry
- To gain knowledge in different effluent treatment methods
- To utilize the by product in the food industry

Name of the Course : BY PRODUCT UTILIZATION			
Course Code :B.V.FP-25		Semester- V	
Duration :75 hrs		Maximum Marks :50	
Teaching Scheme		Examination Scheme	
Theory : 5hrs /week		CE/IC Mark:10 Marks	
Credit :3		End Semester Exam : 40 Marks	
Unit No	Contents	Hrs	WEIGHTAG E
1	Types and formation of by-products; Magnitude of waste generation in different food processing industries; Uses of different agricultural by-products from rice mill, sugarcane industry, oil mill etc.,	15	25%
2	Concept, scope and maintenance of waste management and effluent treatment, Temperature, pH, Oxygen	20	20%

	demands (BOD, COD), fat, oil and grease content, metal content, forms of phosphorous and sulphur in waste waters, microbiology of waste, other ingredients like insecticide, pesticides and fungicides residues,		
3	Waste utilization in various industries, furnace sand boilers run on agricultural wastes and by products, briquetting of biomass as fuel, production of charcoal briquette, generation of electricity using surplus biomass, producer gas generation and utilization,	15	25%
4	Waste treatment and disposal, design, construction, operation and management of institutional community and family size biogas plants, concept of vermin-composting, Pre-treatment of waste: sedimentation, coagulation, flocculation and floatation, Secondary treatments: Biological and chemical oxygen demand for different food plant waste– trickling filters, oxidation ditches, activated sludge process, rotating biological contractors, lagoons,	10	20%
5	Tertiary treatments :Advanced waste water treatment process-sand, coal and activated carbon filters , phosphorous, sulphur, nitrogen and heavy metals removal, Assessment, treatment and disposal of solid waste; and biogas generation, Effluent treatment plants, Environmental performance of food industry to comply with ISO-14001 standards.	15	10%

Reference

1. Abbas Kazmi, Peter Shuttleworth, (2013), "The Economic Utilisation of Food Co-Products", Royal Society of Chemistry Publishing.
2. A.M. Martin, (2012), "Bioconversion of Waste Materials to Industrial Products", Springer Science & Business Media Publishing.
3. Marcos von Sperling, (2007), "Basic Principles of Wastewater Treatment", IWA Publishing.

B.V.FP-26-ENERGY CONSERVATION & MANAGEMENT

Name of the Course : ENERGY CONSERVATION & MANAGEMENT			
Course Code :B.V.FP-26		Semester- V	
Duration :75 hrs		Maximum Marks :50	
Teaching Scheme		Examination Scheme	
Theory : 5hrs /week		CE/IC Mark:10 Marks	
Credit :3		End Semester Exam : 40 Marks	
Unit No	Contents	Hrs	WEIGHTAGE
1	<p>Introduction Potential and opportunities of industrial energy conservation in dairy and food processing. Energy conservation Act 2001 and its important features, Schemes of Bureau of Energy Efficiency (BEE). Electricity Act 2003, Integrated energy policy.</p>	15	25%
2	<p>Energy management & audit Definition, energy audit, need, types of energy audit. Energy audit approach-understanding energy costs, benchmarking, energy performance, matching energy use to requirement, maximizing system efficiencies, optimizing the input energy requirements, fuel and energy substitution. Energy balances and computation of efficiencies of equipment. Role of Energy inspectors and</p>	20	20%

	Auditors in energy management.		
3	<p>Electrical load management</p> <p>Demand management, energy management information systems, Energy saving controllers and cost saving techniques. Quality of power, Power factor and its improvement. Transformers, losses in transformers. Energy savings in transformers. Electric motor-selection and application, Energy efficient motors. Variable Speed Drives and Variable Frequency Drives (VFD) and their role in saving electric energy.</p>	15	25%
4	<p>Bureau of Energy Efficiency (BEE)</p> <p>Power saving guide with "Star Ratings" of electrical appliances: Induction Motors, Air conditioners, Refrigerators and Water Heaters. Energy efficiency and conservation in utilities: High efficiency boilers, improved combustion techniques for energy conservation. Energy conservation in steam distribution systems, efficient piping layouts, protective & insulation coverings in utility pipes. Steam conservation opportunities. Upkeep and maintenance of steam auxiliaries and fittings. Energy conservation in Refrigeration and AC systems (HVAC), Cooling towers, Pumps and pumping systems, Fans, Blowers, Air compressors. Maintenance and up keep of Vacuum lines and Compressed air pipe lines. Conservation and reuse of water, water auditing. Energy conservation opportunities in Wastewater treatment.</p>	10	20%
5	<p>Energy conservation in buildings</p> <p>Concepts of "Green Buildings". Waste-heat recovery and thermal energy storage in food processing facilities. Condensate recovery and reuse. Application of recuperator to recover energy from flue gases from boiler, DG exhaust, hot air from spray dryer, FBD etc. Diesel generating sets (stand by AC Gen sets): Energy saving opportunities in DG sets, Fuel and Oil conservation; important regular maintenance aspects. Carbon credits and carbon trade: Concepts of CDM, economic and societal benefits. Cleaner energy sources: Introduction to Solar, and Bio-mass Energy; Solar thermal and photo-voltaic energy options for food processing industries. Role of automation in conservation of energy in dairy and food processing: Incorporation of enhanced PLC based computer controls and SCADA.</p>	15	10%

Name of the Course : FOOD QUALITY,SAFETY & CERTIFICATION			
Course Code :B.V.FP-27		Semester- V	
Duration :75 hrs		Maximum Marks :50	
Teaching Scheme		Examination Scheme	
Theory : 5hrs /week		CE/IC Mark:10 Marks	
Credit :3		End Semester Exam : 40 Marks	
Unit No	Contents	Hrs	WEIGHTAGE
1	Food quality Definition and its role in food industry; Quality attributes, classification; Color and gloss: Definition, different colors, color measurement by spectrophotometer, Muncellcolor system and Lovibondtintometer; role in food qualities. Role of viscosity and consistency in food quality; Physical properties: Size and shape, weight, volume, weight volume ratio, length, width, diameter, symmetry, curvature, area; Defects, classification.	15	25%
2	Genetic physiological defects: Structural, off color, character; Entomological defects: Holes, scars, lesions, off coloring, curled aves, pathological defects; Mechanical defects, extraneous or foreign material defects; Measurement of defects: Improving visibility by dilution, white background, color differences ,standardization of conditions, reference standards, counts and measures, isolation of defects by floatation, elution, electronic sorting and internal defects	20	20%

3	<p>Flavour Definition and its role in food quality; Taste: Classification, taste qualities, relative intensity, reaction time, effect of disease, temperature, and taste medium on taste, basic tastes, interaction of tastes; Odour: Definition, classification, neutral-mechanisms, olfactory abnormalities, odor testing, techniques ,thresholds, odor intensities, olfaction; Visual, auditory, tactile and other senses, vision, audition, oral perception other than taste</p>	15	25%
4	<p>Factors influencing sensory measurements: Attitudinal factors, motivation psychological errors in judgment, relation between stimulus and perception adaptation; Correlation of sensory and instrumental analysis; Laboratory quality measurement: Types of tests ,panel selection and testing environment, serving procedures, instruction to judges, difference tests, directional difference tests, classification of difference tests, two-sample tests, three sample tests, multisampling tests, comparison of procedures, ranking, scoring, hedonic scaling, dilution procedures, descriptive sensory analysis, contour method, other procedures; Consumer measurement: Factors influencing acceptance and preference, objectives of consumer preference studies, information obtained from consumer study, factors influencing results from consumer surveys, methods of approach, development of the questionnaire, types of questionnaires, serving procedures; Comparison of laboratory panels with consumer panels; Limitations of consumer survey;</p>	10	20%
5	<p>Quality of raw materials: Physical, chemical and microbial quality; Quality of products during processing and after processing: Colour, taste, texture, flavour, appearance; Factors influencing the food qualities: Soil, field practices, harvesting practices, procedures, packaging, transportation, storage, conditions, processing conditions, packaging and storage conditions of finished products. Recording and reporting of quality. Quality inspection, quality control; Quality management and quality assurance: Total quality management, good manufacturing practices ,good agricultural practices, good laboratory practices; Quality management systems, Certification, certification procedures, certifying bodies, accrediting bodies, international bodies.</p>	15	10%

B.V.FP-28-FOOD PLANT SANITATION

Name of the Course :FOOD PLANT SANITATION			
Course Code :B.V.FP-28		Semester- V	
Duration :75 hrs		Maximum Marks :50	
Teaching Scheme		Examination Scheme	
Theory : 5hrs /week		CE/IC Mark:10 Marks	
Credit :3		End Semester Exam : 40 Marks	
Unit No	Contents	Hrs	WEIGHTAGE
1	Good manufacturing practices, current good manufacturing practices; Standard operating procedures, good laboratory practices, sanitation; Sanitation and the food industry: Sanitation, sanitation laws and regulations and guidelines, establishment of sanitary, potential risks of food borne bioterrorism, bioterrorism protection measures, role of pest management in bio-security; Relationship of microorganisms to sanitation, allergens, allergen control;	15	25%
2	Food contamination, protection against contamination; Personal hygiene and sanitary food handling :Role of HACCP in sanitation, quality assurance for sanitation cleaning compounds, handling and storage precautions; Sanitizers, sanitizing methods, sanitation equipment, waste product handling ,solid waste disposal, liquid waste disposal;	20	20%
3	Pest control: Insect infestation, cockroaches, insect destruction, rodents, birds, use of pesticides, integrated	15	25%

	pest management; Sanitary design and construction for food processing: Site selection, site preparation, building construction considerations, processing and design considerations, pest control design;		
4	Low-moisture food manufacturing and storage sanitation: Sanitary construction considerations, receipt and storage of raw materials, cleaning of low-moisture food manufacturing plants; Dairy processing plant sanitation: Role of pathogens, sanitary construction considerations, soil characteristics in dairy plants, sanitation principles, cleaning equipment; Meat and poultry plant sanitation: Role of sanitation, sanitation principles, cleaning compounds for meat and poultry plants, sanitizers for meat and poultry plants, sanitation practices, sanitation procedures;	10	20%
5	Sea food plant sanitation :Sanitary construction considerations, contamination sources, sanitation principles, recovery of by-products; Fruit and vegetable processing plant sanitation: Contamination sources, sanitary construction considerations, cleaning considerations, cleaning of processing plants, cleaners and sanitizers, cleaning procedures, evaluation of sanitation effectiveness; Beverage plant sanitation: Mycology of beverage manufacture, sanitation principles, non-alcoholic beverage plant sanitation, brewery sanitation, winery sanitation, distillery sanitation; Waste management of food processing plants.	15	10%

Name of the Course : BY PRODUCT UTILISATION LAB		
Course Code :B.V.FP-29		Semester- V
Duration :32 hrs		Maximum Marks :50
Teaching Scheme		Examination Scheme
Practical : 4hrs /week		CE/IC Mark:10 Marks
Credit :1.5		End Semester Exam : 40 Marks
Unit .No	Contents	Hours
1.	Determination of temperature, pH, turbidity solids content, BOD and COD of waste water	04
2	Determination of ash content of agricultural wastes and determination of un-burnt carbon in ash	04
3	Study about briquetting of agricultural residues	04
4	Estimation of excess air for better combustion of briquettes	04
5	Study of extraction of oil from rice bran	04
6	Study on bioconversion of agricultural wastes	04
7	Recovery of germ and germ oil from by-products of cereals	04
8	Visit to various industries using waste and food by-products.	04

B.V.FP-30-TRADITIONAL INDIAN DAIRY PRODUCTS

Name of the Course : TRADITIONAL INDIAN DAIRY PRODUCTS		
Course Code :B.V.FP-30		Semester- V
Duration :75 hrs		Maximum Marks :50
Teaching Scheme		Examination Scheme
Practical : 4hrs /week		CE/IC Mark:10 Marks
Credit :1.5		End Semester Exam : 40 Marks
Unit .No	Contents	Hours
1.	Preparation of Khoa from cow, buffalo and concentrated milk.	04
2	Preparation of Burfi, Peda, Kalakand, Milk cake and Gulabjamun.	04
3	Preparation of Paneer from cow, buffalo and mixed milk.	04
4	Preparation of Channa from cow and buffalo milk and mixed milk.	04
5	Preparation of Sandesh and Rasagolla.	04
6	Preparation of kheer.	04
7	Preparation of Rabri, Misti Dahi, Chhaka and Shrikhand.	04
8	Visitto industry.	04

Name of the Course : On – Job- Training					
Course Code :OJT-05		Semester- V			
Duration :150 hrs		Maximum Marks :200			
Credit :15					
Unit .No	Contents	Mark distribution			Credit
1.	Traditional Snack & Savoury Maker/Fish& Sea Food Processing Technician	OJT Marks by the SKP	OJT REPORT	VIVA	15
		100	50	50	
Total Marks of University		200			

Course code	Subject	No. of Hours /Week		Total hours /semester	Credits	Total Marks		Exam Duration
		Proposed Syllabus		Sixth semester syllabus		EXT	IC	
		T	P					
B.V.FP-31	Marketing Management & Trade	5	-	50	3	40	10	2
B.V.FP-32	Project Preparation & Management	5	-	50	3	40	10	2
B.V.FP-33	Financial Management & Cost Accounting	5	-	50	3	40	10	2
B.V.FP-34	Project Work	5	-	50	3	150	-	2
On-Job-Training(OJT)								
Production Manager				150	15	200		
Total		20	8	450	30	470	30	
Total marks of University		E		IC		Total		
		120	350	30		500		
		470		30				

B.V.FP-31-MARKETING MANAGEMENT & TRADE

Course Overview and Context

To know about the various types marketing strategy involved in generating sales for a new product food products'

To have a basic idea about different marketing skills,

To know the different ways in which a food can be marketed to give optimum visibility,

To understand the importance of packaging in improving sales and the latest marketing trends

Name of the Course :MARKETING MANAGEMENT & TRADE			
Course Code :B.V.FP-31		Semester- VI	
Duration :75 hrs		Maximum Marks :50	
Teaching Scheme		Examination Scheme	
Theory : 5hrs /week		CE/IC Mark:10 Marks	
Credit :3		End Semester Exam : 40 Marks	
Unit No	Contents	Hrs	WEIGHTAGE
1	Concept of marketing; Functions of marketing; concepts of marketing management; scope of marketing management; marketing management. Process; concepts of marketing- mix, elements of marketing- mix.	15	25%
2	Market Structure and Consumer Buying Behaviour: Concept of market structure, marketing environment, micro and macro environments. Consumers buying behaviour, consumerism. Marketing Opportunities Analysis: Marketing research and marketing information systems; Market measurement- present and future demand; Market forecasting; market segmentation, targeting and positioning. Allocation and marketing resources. Marketing Planning Process.	20	20%
3	Product policy and planning: Product-mix; product line; product life cycle .New product development process. Product brand, packaging, services decisions. Marketing channel decisions. Retailing, wholesaling and distribution. Pricing Decisions. Price determination and pricing policy of milk products in organized and unorganized sectors of dairy industry.	15	25%
4	Promotion-mix decisions. Advertising; How advertising works; Deciding advertising objectives, advertising budget and advertising message; Media Planning;	10	20%

	Personal Selling, Publicity;		
5	Sales Promotion. Food and Dairy Products Marketing. Marketing and Trade. Composition & direction of Indian exports; Exports- Direct exports, indirect exports, Licensing, Joint Ventures, Direct investment & internationalization process, Deciding marketing Programme; Product, Promotion, Price, Distribution Channels. Deciding the Market Organization.	15	10%

Name of the Course :PROJECT PREPERATION & MANAGEMENT			
Course Code :B.V.FP-32		Semester- VI	
Duration :75 hrs		Maximum Marks :50	
Teaching Scheme		Examination Scheme	
Theory : 5hrs /week		CE/IC Mark:10 Marks	
Credit :3		End Semester Exam : 40 Marks	
Unit	Contents	Hrs	WEIGHTAG

No			E
1	Overview of project management: Functions and viewpoints of management, evolution of project management, forms and environment of project management; Project life cycle	15	25%
2	Project selection: Project identification and screening, project appraisal, project charter, project proposal ,project scope, statement of work	20	20%
3	Project planning and scheduling: Work breakdown structure ,planning and scheduling of activity networks, network scheduling, precedence diagrams, critical path method, program evaluation and review technique, assumptions in PERT modelling, decision CPM, GERT	15	25%
4	Project cost estimating: Types of estimates and estimating methods, dynamic project planning and scheduling, time-cost trade-offs, resource considerations in projects, resource profiles and levelling , limited resource allocation	10	20%
5	Project implementation, monitoring and control: Project management process and role of project manager, team building and leadership in projects, organizational and behavioural issues in project management, project monitoring and control, PERT/cost method, earned value analysis; Project completion and future directions: Project completion and review; Project management: Recent trends and future directions; Computers in project management.	15	10%

Reference Books:

1. Project Management, S.C. Sharma, Khanna Publishing House

Name of the Course :FINANCIAL MANAGEMENT & COST ACCOUNTING			
Course Code :B.V.FP-33		Semester- VI	
Duration :75 hrs		Maximum Marks :50	
Teaching Scheme		Examination Scheme	
Theory : 5hrs /week		CE/IC Mark:10 Marks	
Credit :3		End Semester Exam : 40 Marks	
Unit	Contents	Hrs	WEIGHTAG

No			E
1	<p>Introduction Definition, scope and objectives of financial management. Different Systems of Accounting: Financial Accounting, Cost accounting, Management Accounting. Double entry system of Book-Keeping. Preparation of Accounting Records: Journal, Purchases and Sales Book and Posting in Ledger, Cash Book. Preparation of Final Accounts and adjustments at the end of trading period. Preparation of Trial Balance Banking Transactions and Bank reconciliation statements. Statements of Financial Information: Accounting system: A source of financial statements, Classification of capital and revenue expenditure, Balance Sheet, Profit and Loss Account, Statement of changes in the financial position, funds flow statements, cash flow statement, uses of funds flow and cash flow statements in financial decision making.</p>	15	25%
2	<p>Financial Analysis Nature and uses of financial analysis, Liquidity ratios, Leverage ratios, Activity ratios, Profitability ratios, Utility of Ratio analysis. Cost Volume – Profit analysis and operating leverage, Break-even analysis, Profit analysis and operating analysis, Utility of CVP analysis. Capital Structure: C.S Planning, risk return trade off, financial leverage. Cost of capital: Management of cost of capital, cost of debt, debentures, preference share capital, equity share capital & retained earnings, overall cost of capital.</p>	20	20%
3	<p>Investment decision Time value of money, Net present value, Investment evaluation criteria, NPV method, Internal rate of return method, Profitability index method, Payback period method, Accounting rate of return method. Capital budgeting: Complex Investment Decisions: Investment timing & duration Investment decisions under inflation, Investment decisions under capital rationing.</p>	15	25%
4	<p>Project Report Feasibility Report Valuation. Working capital management-Concept & determinants of working capital, Estimating working capital needs. Depreciation-Concept and method. Introduction, Definition, Objectives, Common terms. Costing: Essentials of sound costing system. Different methods of costing, elements of cost: Labour-</p>	10	20%

	recording of time, idle time, methods of remunerating labour, Premium & Bonus Plans, Materials, Overheads.		
5	<p>Cost classification</p> <p>Direct and Indirect expenses, fixed and variable costs. Various methods of apportioning indirect expenses. Inventory Management: Planning, control and costing. Stores& storekeeping, scope & importance, purchase procedure, types of purchase, location of stores& materials, procedure for the movement of stores, different methods of pricing materials, store records. Cost Sheets-Different methods, Statement of cost and statement of profit estimates, Tenders or Quotations. Contract or Terminal costing. Process Costing: Process losses and interprocess profits, joint products and by products costing. Ascertainment of cost of milk production. Preparation of Cost Account Information for managerial decisions.</p>	15	10%

Name of the Course : On – Job- Training					
Course Code :OJT-06			Semester- VI		
Duration :150 hrs			Maximum Marks :200		
Credit :15					
Unit .No	Contents	Mark distribution			Credit
1.	Production Manager	OJT Marks	OJT	VIVA	15

		by the SKP	REPORT		
		100	50	50	
Total Marks of University		200			