



PERIYAR UNIVERSITY

**Periyar Palkalai Nagar, Salem-636011
(Reaccredited with 'A' Grade by the NAAC)**



SCHOOL OF PROFESSIONAL STUDIES

DEPARTMENT OF FOOD SCIENCE AND NUTRITION

B.VOC. PROGRAMME



[Choice Based Credit System (CBCS)]

OBE REGULATIONS AND SYLLABUS

(Effective from the academic year 2018-2019 and thereafter)

B.Voc. FOOD SCIENCE AND NUTRITION

REGULATIONS (2018-19 onwards)

Preamble

The Department of Food Science and Nutrition aims in developing human resources, to expand and transfer knowledge for continuous improvement of the safety, quality and value of food products. Food Science and Nutrition is an interdisciplinary programme. The department has sanctioned to offer B.Voc. Food Science and Nutrition programme from the academic year 2015 -16 with funding assistance from UGC (Rs.1.7 crores for both the Food Science and Nutrition and Textiles and Apparel Design Programmes).

General Graduate Attributes

- Effective communicator
- Team worker
- Leader
- Interactive person or rapporteur
- Professional ethics follower
- Reflective thinker
- Digitally literate
- Sense of inquiry
- Job creator
- Problem solver
- Policy maker
- Lifelong learner and learning provider

Programme Specific Qualification Attributes

- **Knowledge and understanding** on Science and Handling of raw materials, methods of processing perishable, semi-perishable and non-perishable foods, food quality evaluation, food packaging technology, food safety measures, rules, regulations, Act, quality assurance system for food production, food quality control, nutrition in life and nutritional management of disease, etc
- **Analytical skill** on basic food chemistry, Processing and Preservation of perishable, semi-perishable and non-perishable foods, Development of Bakery Products, checking the quality of food, diet planning for an individual, Nutritional Assessments and Diet Planning, IT-Applications in food industries, etc
- **Application skill** on handling and enterprising the nutritional conservation and balancing the available nutrients in food manufacturing system at the industry, institutional kitchens, school lunch programme, hospital catering and personalized diet, development of convenience foods, sago processing technology, minimally processed foods, etc
- **Scientific skills** on innovative food product development, designing business plan and quality assurance system for a product, identifying nutritional policy gap in the community and personalized nutrition
- **Job specific qualification skills** (NSDC QPs) on Purchase Assistant-Food and Agricultural Commodities, Plant Baker/Dairy Products Processor, Quality Assurance Manager/Chief Miller, Production Manager.

Vision

Inculcation of knowledge, productive learning, life and entrepreneurship skills and employability among the youth related to Food Science and Nutrition

Programme Objectives and Outcomes

Hence to inculcate the importance in developing Food and Nutritional Science among the budding Food Scientists, Nutritionists and Food Processing Industrialists, the B.Voc., *Food Science and Nutrition* programme is aimed with the following objectives and outcomes.

Programme Education Objectives	Programme Outcomes	Programme Specific Objectives
Learners are trained to perform the duties and responsibilities of 1. Purchase Executive/ Purchase Assistant 2. Store Executive/ Store In Charge/ Store Assistant 3. Quality Assurance Manager 4. Food Microbiologist 5. Executive-Production / Line-In Charge (Raw material line, Pre-processing line, Processing line) 6. Packaging Line In-charge / Packaging Line Supervisor / Packaging Technician 7. Abattoir In Charge 8. Brewer/Wine Maker 9. Production Manager 10. Food Regulatory Affairs Manager 11. Processed Food Entrepreneur 12. Plant Baker/ Craft Baker/Assistant Baker/ Plant Biscuit Production Specialist/Baking Technician/Operative (Oven Operator)/Mixing Technician (Dough	The student can able to know, understand, apply, analyze, evaluate and create the relationship between food, technology, nutritional science and quality of life. PO-01: able to identify the methods of procuring, sorting, grading, safe storing of food raw materials PO-02: able to determine the processing and preservation techniques of different food groups and calculate the cost analysis on innovative nutritious products developed PO-03: able to generate quality assured, microbially safe, nutritionally secured production system for an end product with safe packaging technologies PO-04: able to solve the issues and problems prevailing in food trade and business operation, food waste management, Computer application in food industries PO-05: able to manage the diet of an individual through personalised nutritional care and able to identify the	PSO-01: Engineered to theoretical and practical aspects of the entire food chain from farm to fork. PSO-02: Gain insight into the food formulations, food quality testing and management of safe food production. PSO-03: Develop skills for various job roles related to Food Science and Technology division and entrepreneurship.

<p>Maker)/ Cake decorator/ Bread and Cake Slicer/ Slicing Machine Operator</p> <p>13. Lab Technician/Technician - Water Treatment Plant, Syrup preparation, Flavour Mixing, Soft Drink Proportionation, Carbonation, Bottling</p> <p>14. Primary, Secondary and Tertiary, Packaging Technician</p> <p>15. Fork Lift Operator</p> <p>16. Ice Flaker / Operator- Ice Flaking machine</p> <p>17. Fish and Seafood Processing Technician</p> <p>18. Sorter/Grader - raw material (fish & seafood)</p> <p>19. Head Cutter /Operator - Deheader machine</p> <p>20. Operator – Pasteurizer, Vibrating machine, freezer, Glazing Machine, Filter, Homogenizer</p> <p>21. Standardization Operator</p> <p>22. Technician- Syrup preparation, Flavour Mixing, Soft Drink Proportionation, Carbonation, Bottling</p> <p>23. Butcher/ Slaughterer</p> <p>24. Cold Storage Technician</p> <p>25. Offal Collector and Utilizer</p> <p>26. Poultry Dresser</p> <p>27. Dairy Processing Equipment Operator</p> <p>28. Cottage Cheese Maker</p> <p>29. Milk Powder Manufacturing Technician</p> <p>30. Butter and Ghee Processing Operator</p> <p>31. Chief Miller (Cereals, Pulses, Millets)/Grain Mill</p>	<p>causes/determinants of nutritional deficiency disorders/metabolic disorders</p>	
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Operator 32. Extruder Operator 33. Pulse Processing Technician 34. Corn/Starch Manufacturing Technician 35. Oil Extraction and Refining Technician 36. Fruit Ripening Technician 37. Fruit Pulp Processing Technician 38. Jam, Jelly and Ketchup Processing Technician 39. Fruit and Vegetables Canning Technician 40. Spice Processing Technician 41. Traditional Snacks and Savoury Maker 42. Convenience Food Maker		
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This programme is offered under Choice Based Credit system (CBCS). Students can earn more credits than the stipulated minimum of 180 credits, through Extra Credit Courses (includes courses under FoSTAC), Massive Open Online Courses (SWAYAM).

Candidate's eligibility for admission

Any candidate passed +2 examinations in any subject approved by TNBSC/CBSE/ICSE or any Diploma/UG degree, approved by the Association of Indian Universities are eligible to seek admission. Vocational stream students are most preferred.

Duration of the course - Three years (120 days per semester includes 30 days of Apprenticeship)

S.No.	Exit Programme Level	Duration
1.	Certificate in Food Science and Handling	6 months
2.	Diploma in Food Science and Processing	12 months
3.	Advanced Diploma in Food Processing and Quality Control	24 months
4.	B.Voc. in Food Science and Nutrition	36 months

Part A

Credits for General Education Component	- 72
Credits for Skill Component	- 108
Total credits	- 180

Part –B

Modular Training Delivery Plan (Extra) – 04 - 08

Total credits - 08**Credit Calculation Table**

(UGC Guidelines for curricular aspects, Assessment criteria and credit system in skill based vocational courses under NSQF)

Method of teaching	Hours	Credits
Lecture	1	1
Tutorial/Demonstration	1	1
Practical/Internship/On the job training/ self-Learning	2	1

Teaching methodologies

The **classroom teaching** would be through conventional lectures, video presentations and use of OHP and Power point presentations. The lecture would be such that the students should participate actively in the discussion, student's seminar and multi sensory approach in learning. The scientific discussions would be arranged to improve their communicative skills.

In the laboratory, instructions would be given for the **experiments** followed by **demonstration** and finally the students have to do the experiments individually. Periodic tests would be conducted and for the students of slow learners would be given special attention.

The student will be required to undergo an **internship** for a total duration of two weeks in their chosen area of interest in each semester as mentioned in the structure of the programme which will facilitate skills and professional career in the same field.

Modular Training Delivery Plan

Students should undergo one **Modular Training Delivery Plan** in each semester (II, III, IV and V) in accordance with the curriculum as extra credit courses. Each course completion will fetch additional two credits for the students during their course of study.

S.No.	Title of MTDP	Semester	Duration (week)
1.	Minimally Processed Fruits and Vegetables	II	7 days (56 hours)
2.	Sago Processing Technology	III	7 days (56 hours)
3.	Dairy Technology	IV	7 days (56 hours)
4.	Convenience Food Technology	V	7 days (56 hours)

CBCS- STRUCTURE OF THE PROGRAMME

The programme structure comprises of two parts.

Course Component	No. of Courses	Hours of Learning	Marks	Credits
Part A (General Education Component)				
Language I – Tamil/Hindi	02	108	200	06
Language II – Functional English Practical	02	144	200	06
Core Courses	16	864	1600	41
Allied Courses	04	216	400	08
Elective Courses	04	216	400	09
Foundation/Value Education Courses	02	72	200	02
Online Courses	+03	18	-	-
Total	30+03	1638	3000	72
Part B (Skill Component)				
NSDC-QP	04	1512	400	72
Internship	06	1440	300	12
Portfolio	06	(in QP hour)	300	12
Mini Project	06	(in Apprenticeship hour)	300	12
Total	22	2955	1300	108

Scheme for Evaluation

Evaluation will be done on a continuous basis and will be evaluated five times during the course work. The first evaluation will be in the 4th week, the second in the 8th week, third in the 12th week, fourth week in the 18th week and the end – semester examination in the 20th week. The General Education Component is assessed by the University and Skill Education Component by the University and SSCs.

Extra-curricular Activities

The students have to participate in the following activities of the University Departments or outside the University (minimum of 10 hours in a semester) and it is mandatory that the

students have to submit two participation/winner certificate in any one of the activity every year to the Department.

1. NSS/NCC/YRC camps and its competitions
2. Inter-institutional/Inter-departmental competitions
3. Personality Development programmes
4. Student Seminar
5. Placement training
6. Typewriting class
7. Language coaching class

Remedial Coaching

In order to improve the knowledge, skills and linguistic proficiency of students who need special attention, remedial coaching classes on

- a. Basic laboratory techniques
- b. Oral presentation skills
- c. Notes taking and exam preparation techniques

is conducted for one hour in a weak in rotation by all faculty in the Department as extra workload for teaching. The hour will be mentioned in the time table to motivate the students to attend the remedial classes.

Mentor-Mentee System

The students of Department of Food Science and Nutrition are supported by all faculties in the Department personally and professionally through mentor and mentee system under the umbrella of Youth Club. Faculties will guide the students on all aspects of Youth Club policies.

Both Mentor and Mentee will follow the guidelines of Youth Club. All students will become the member of the Youth Club, can forecast their activities to build their general graduate attributes.

Grading System

Evaluation of performance of students is based on ten-point scale grading system as given below.

Ten Point Scale			
Grade of Marks	Grade points	Letter Grade	Description
90-100	9.0-10.0	O	Outstanding
80-89	8.0-8.9	D+	Excellent
75-79	7.5-7.9	D	Distinction
70-74	7.0-7.4	A+	Very Good
60-69	6.0-6.9	A	Good
50-59	5.0-5.9	B	Average
00-49	0.0	U	Re-appear
ABSENT	0.0	AAA	ABSENT

Equivalence of the Programme

Candidates completed B.Voc. Food Science and Nutrition is equivalent to B.Sc. Nutrition and Dietetics, BSc. Food Science & Nutrition, BSc. Food science & Technology and B.Sc. Food Technology all its related disciplines awarded by any UGC recognized Universities and Institutions.

CURRICULAR FRAMEWORK OF B.Voc. PROGRAMME

SEM	PART	COURSE CODE	COURSE	HRS		CREDIT	MARKS		
				L/T	P		IA	EA	TOTAL
Semester I									
General Education Component									
I	I	18BFSNL01/ 18BFSNLH01	Part I -Tamil-I/ Hindi - I	3	-	3	25	75	100
	II	18BFSNE01	Part II – Functional English Practical - I	2	2	3	40	60	100
	III	18BFSNC01	Core I - Science & Handling of Raw Material	3	-	3	25	75	100
	III	18BFSNA01	Allied I – Food Science and Chemistry –I- Practical	1	2	2	40	60	100
	IV	18BFSNV01	Val.Edu.I– Yoga and Fitness Practical	-	2	1	40	60	100
	IV	18BFSNOC01	Online Course - SWAYAM	1	-	-	-	-	-
	Skill Component								
	V	18BFSNSC01	QP - Purchase	10	4	12	-	100	100

			Assistant Level – 4						
	VI	18BFSNAS01	Internship	-	-	2	20	30	50
	VII	18BFSNPF01	Portfolio	-	-	2	20	30	50
	VIII	18BFSNMP01	Mini Project	-	-	2	20	30	50
					30	30			750
Semester II									
General Education Component									
II	I	18BFSNL02/ 18BFSNLH02	Part I - Tamil –II/ Hindi – II	3	-	3	25	75	100
	II	18BFSNE02	Part II – Functional English Practical - II	2	2	3	40	60	100
	III	18BFSNC02	Core II- Food Processing I (Technology of Cereals, Pulses, Oilseeds and Spices)	3	-	3	25	75	100
	III	18BFSNA02	Allied II – Food Science and Chemistry –II Practical	1	2	2	40	60	100
	IV	18BFSNV02	Val.Edu. II – Environmental Studies	1	-	1	25	75	100
	IV	18BFSNTC01	Milling Techniques/ Sago Processing	1	-	-	-	-	-

			Techniques						
	Skill Component								
	V	18BFSNSC02	Plant Baker Level – 5	10	4	12	-	100	100
	VI	18BFSNAS02	Internship	-	-	2	20	30	50
	VII	18BFSNPF02	Portfolio	-	-	2	20	30	50
	VIII	18BFSNMP02	Mini Project	-	-	2	20	30	50
					30	30			750
Semester III									
General Education Component									
III	III	18BFSNC03	Core III – Food Processing II (Technology of Fruits and Vegetables, Sugar and Salt)	3	-	3	25	75	100
	III	18BFSNC04	Core IV – Food Processing III (Technology of Milk, Egg and Fleshy Foods)	3	-	3	25	75	100
	III	18BFSNA03	Allied III – Food Product Development and Marketing – I Practical	1	2	2	25	75	100
	III	18BFSNC05	Core V – Food Processing and Preservation – I Practical	1	2	2	40	60	100

	III	18BFSNEL01	Elective I – Nutritional Chemistry	2	1	2	25	75	100
	IV	18BFSNOC02	Online Course - SWAYAM	1	-	-	-	-	-
	Skill Component								
	V	18BFSNSC03	Quality Assurance Manager Level - 6	10	4	12	-	-	-
	VI	18BFSNAS03	Internship	-	-	2	20	30	50
	VII	18BFSNPF03	Portfolio	-	-	2	20	30	50
	VIII	18BFSNMP03	Mini Project	-	-	2	20	30	50
					30	30			650
Semester IV									
General Education Component									
IV	III	18BFSNC06	Core VI – Food Quality Control	3	-	3	25	75	100
	III	18BFSNC07	Core VII – Instrumentation and Process Control	3	-	3	25	75	100
	III	18BFSNA04	Allied IV – Food Product Development and Marketing II - Practical	1	2	2	40	60	100
	III	18BFSNC08	Core VIII - Food Processing and Preservation - II	1	2	2	40	60	100

			Practical						
	III	18BFSNEL02	Elective II – Food for Life	2	1	2	25	75	100
	IV	18BFSNTC02	Minimal Processing of Fruits and Vegetables/Meat Butching Techniques	1	-	-	-	-	-
	Skill Component								
	V	18BFSNSC03	Quality Assurance Manager Level - 6	10	4	12	-	100	100
	VI	18BFSNAS03	Internship	-	-	2	20	30	50
	VII	18BFSNPF03	Portfolio	-	-	2	20	30	50
	VIII	18BFSNMP03	Mini Project	-	-	2	20	30	50
					30	30			750
Semester V									
General Education Component									
V	III	18BFSNC09	Core IX – Food Microbiology	3	-	3	25	75	100
	III	18BFSNC10	Core X – Food Packaging Technology	3	-	3	25	75	100
	III	18BFSNC11	Core XI - Food Microbiology Practical	1	2	2	40	60	100
	III	18BFSNC12	Core XII - Food Quality Analysis	1	2	2	25	75	100

			Practical						
	III	18BFSNEL03	Elective III – Food for Disease	2	1	2	25	75	100
	IV	18BFSNOC03	Online Course - SWAYAM	1	-	-	-	-	-
	Skill Component								
	V	18BFSNSC04	Food Production Manager Level – 7	10	4	12	-	-	-
	VI	18BFSNAS04	Internship	-	-	2	20	30	50
	VII	18BFSNPF04	Portfolio	-	-	2	20	30	50
	VIII	18BFSNMP04	Mini Project	-	-	2	20	30	50
					30	30			650
Semester VI									
General Education Component									
VI	III	18BFSNC13	Core XIII–Food Industrial by-products and Waste Management	3	-	3	25	75	100
	III	18BFSNC14	Core XIV – Food Trade and Business Management	3	-	3	25	75	100
	III	18BFSNC15	Core XV – Nutrition Assessment and Diet Planning Practical	1	2	2	40	60	100
	III	18BFSNC16	Core XVI –IT	1	2	2	40	60	100

			Application in Food Industry Practical						
III	18BFSNEL04		Elective IV – Nutrition and Physical Fitness	2	1	2	25	75	100
IV	18BFSNTC03		FoSTAC Basic level (Manufacturing Sector)/HACCP level 1	1	-	-	-	-	-
Skill Component									
V	18BFSNSC04		Food Production Manager Level – 7	10	4	12	-	100	100
VI	18BFSNAS04		Internship	-	-	2	20	30	50
VII	18BFSNPF04		Portfolio	-	-	2	20	30	50
VIII	18BFSNMP04		Mini Project	-	-	2	20	30	50
					30	30			750
TOTAL				180 Hrs	180	4300 Marks			

Note :- L- Lecture, T-Tutorial, P- Practical, C- Credit, IA – Internal Assessment, EA – External Assessment

Part I - Tamil

Part II - Functional English Practical

Part III - Core / Allied /Elective

Part IV - Foundation / Value Education/MOOC / FoSTAC Basic level/MTD

Part V - NSDC (National Skill Development Corporation) / Skill Based Subjects

Part VI – Internship

Part VII – Portfolio

Part VIII – Mini Project

Examinations

Examinations are conducted in semester pattern. The examination for the Semester I, III & V will be held in November/December and that for the Semester II, IV & VI will be in the month of April/May.

Candidates failing in any subject (both theory, practical) will be permitted to appear for such failed subjects in the same syllabus structure at subsequent examinations within next 5 years. Failing which, the candidate has to complete the course in the present existing syllabus structure. But candidates failing in Skill Paper will not be permitted to be enrolled in the Next Level, only after completing subsequent Levels can elevate to the next level (UGC B.Voc Guideliness).

Scheme for Evaluation and Attainment Rubrics

Evaluation will be done on a continuous basis and will be evaluated four times during the course work. The first evaluation will be in the 7th week, the second in the 11th week, third in the 16th week and the end – semester examination in the 19th week. Evaluation may be by objective type questions, short answers, essays or a combination of these, but the end semester examination is a University theory examination with prescribed question paper pattern.

Attainment Rubrics for Theory Courses(K1, K2, K3, K4 and K5)

Internal(Max. Marks- 25)

- Activity documents on K3, K4 and K5 level in CO1, CO2, CO3, CO4 and CO5- 05 Marks
- Communication skill + ppt. upload – 05 Marks
- Internal Tests (K1 and K2) and Problem Solving Exercises (K3 and K4) - 10 (Each 5 Marks)
- Attendance - 05 marks

External(Max. Marks- 75)

Question Paper Pattern (Theory)

Section	Approaches	Mark Pattern	K Level	CO Coverage
A	One word (Answer all questions)	20X1 = 20 (Multiple Choice Questions)	K1, K2	CO1 – 20%, CO2 – 20%, CO3 – 20%, CO4 – 20 % and CO5 – 20%
B	100 to 200 words (Answer any three out of five questions)	3X5 = 15 (Analytical type questions)	K3, K4, K5	CO1 – 20%, CO2 – 20%, CO3 – 20%, CO4 – 20 % and CO5 – 20%
C	500 to 1000 words	5X8 = 40 (Essay type questions)	K1, K2	CO1 – 20%, CO2 – 20%, CO3 – 20%, CO4 – 20 % and CO5 – 20%

Attainment Rubrics for Lab Courses (K3, K4 and K5)

Internal(Max. Marks-40)

- Good Laboratory Practices - 05 Marks
- Standard Operating Procedure for one Equipment - 10 Marks
- Performance Evaluation - 10 Marks
- Internal Tests – 10 (Best two out of three tests: Each 05 Marks)
Internal test components are
 - Initial procedure (5 marks)
 - Conduct of experiment (5 marks)
 - Result Analysis (5 marks)
 - Viva- Voce (5 marks)
- Attendance - 05 marks

External(Max. Marks- 60)

External test components are

- Initial procedure (5 marks)
- Conduct of experiment (10 marks)
- Result Analysis (10 marks)
- Viva- Voce (5 marks)

Student can perform two experiments (Each 30 marks)

Attainment Rubrics for Experiential Learning Courses/Industrial Visit (04) and Internship (02)

Internal(Max. Marks–50 for Industrial Visit and 50 for Internship)

For Industrial visit/Internship, the continuous assessment can be through

- First review- Identification of industries – 25% (10 marks)
- Second review- Visit certificate and documentation with industrial approval – 25% (10 marks)
- Third review: – Viva-Voce - 50% (20 marks)

Evaluation criteria for Viva-Voce can be on the basis of

- Subject knowledge (technical skills) - 50 % (30 marks)
- Analytical skills - 30 % (18 marks)
- Communication skill - 20 % (12 marks)

Results are reported as satisfactory (secured 50% or more marks) or unsatisfactory (secured less than 50% marks)

Attainment Rubrics for Innovative Learning Courses/Research (Part 1, 2, 3 and 4)

Internal(Max. Marks-40)

For Project/ Dissertation the continuous assessment can be through review seminars by project review committee of the Depart/ Centre

- First review- literature survey and problem identification – 25% (10 marks)
- Second review- Design methodology – 25% (10 marks)
- Third review: validation of model and documentation – 50% (20 marks)

External(Max. Marks- 60)

Evaluation criteria for Viva-Voce can be on the basis of

- Subject knowledge (technical skills)- 50 % (30 marks)
- Analytical skills- 30 % (18 marks)
- Communication skill- 20 % (12 marks)

Attainment Rubrics for On-the-Job Training Courses/Skill Component (02)

Internal(Max. Marks-40)

For NSDC QP, the continuous assessment can be through

- First review- Creation of Templates for Performance Criteria – 50% (20 marks)
- Second review- Activity based Self Learning – 25% (10 marks)
- Third review: – Internal Tests - 25% (10 marks)

External (Max. Marks- 60)

Evaluation criteria for external assessment by respective Sector Skill Council can be on the basis of

- Subject knowledge (Technical skills) - 30% (18 marks)
- Analytical skills- 30% (18 marks)
- Generic skills- 20% (12 marks)
- Communication skill – 20% (12 marks)

மொழிப்பாடம் I தமிழ் I

இளநிலைத் தொழிற்கல்வி - உணவு அறிவியல் மற்றும் ஊட்டச்சத்துத்துறை

பாட எண் : 15BFSNL01

மதிப்பெண் : 75

அலகு : 1 - உணவு அறிமுகம்

உணவு என்ற சொல் - உணவும் அதன் இன்றியமையாமையும் உணவின் பெயர்கள் - உணவும் தமிழரும் - உணவு வகை, உணவுப் பொருட்களின் மறுபெயர்கள் பற்றி நிகண்டுகள் குறிப்பிடுவது - உணவின் பிறப்பெயர்கள் - நில அடிப்படையில் உணவு (குறிஞ்சி - முல்லை - மருதம் - நெய்தல் - பாலை முதலான) ஐந்நில உணவுப் பொருட்கள்.

அலகு: 2 - திடவுணவும் நீருணவும்

தாவர உணவு - துணைக்கூழ் உணவுப் பொருட்கள் - இலை வகைகள் - பூக்கள் - காய்கள் - கனிகள் - விதைகள் - கிழங்குகள் - பலகாரங்கள் - குழம்பு - இறைச்சி வகைகள் - நீர் - அருவிநீர் - காட்டாற்று நீர் - கடும்பின் சாறு - நுங்கு - முந்தீர் - பால் - பால்பொருட்கள் - தயிர் - மோர் - நெய் - தேன் போன்றவை.

அலகு : 3 - உணவின் பண்பாடும் உண்ணும் முறையும்

உண்ணும் உணவின் அளவு - உண்ணும் நேரம் - காலை உணவு - நண்பகல் உணவு - மாலை உணவு - உண்ணும் முறை - உண்பன - தின்பன - கொரிப்பன - பருகுவன - பண்பாடு விருந்தோம்பல் - இரப்போர்க்கு ஈவதில் பண்பாடு - கடவுளார்க்கும் உணவு படைத்த பண்பாடு - உண்ணுதலில் பண்பு.

அலகு : 4 - தமிழ் சமுதாயத்தில் உணவு

நிலைக்கு ஏற்ப உணவு - செல்வர் உணவு - உணவு பெற்ற நிலை - உணவு படைக்கப்பட்ட நிலை - வறியர் உணவு - பல்வேறு பிரிவினர்க்குரிய உணவு - அந்தணர் உணவு - பெண்டிர் உணவு - கைமைப் பெண்டிர் உணவு - வரர் உணவு - விரத உணவு - உணவு சேகரித்த நிலை - பக்குவம் செய்த முறை - உணவு விற்றலில் சில நிலைகள் - நம்பிக்கைகளும் உணவும் - இன்றையத் தமிழர் பயன்படுத்தும் உணவுப் பொருட்கள்.

அலகு : 5 - உணவின் சிக்கல்களும் தீர்வுகளும்

உணவினால் அறியப்படும் தொழில் முன்னேற்றம் - பண்டமாற்று முறை - பிற்கால உணவு வகைகள் - பயணியின் உணவு - உணவு விதிகள் - உணவுப் பொய்கள் - சமையல் கலை - தமிழர்கள் என்ன சாப்பிட்டார்கள் - விவசாயத்தில் பன்னாட்டு நிறுவனங்கள் - உணவில் பன்னாட்டுச் சந்தை - உணவின் சிக்கல்களும் தீர்வுகளும்.

மொழிப்பாடம் I தமிழ் II

இளநிலைத் தொழிற்கல்வி - உணவு அறிவியல் மற்றும் ஊட்டச்சத்துத்துறை

பாட எண் : 15BFSNL01

மதிப்பெண் : 75

அலகு - 1

அறுசுவைகளில் இனிப்பு - துடரிப்பழம் - பலாப்பழம் - வாழைப்பழம் - நாவல்பழம் - கரும்பின் சாறு - தேன் - உவர்ப்பு - எரிப்பு - கசப்பு - துவர்ப்பு - புளிப்பு - உணவுகளைப் படைக்கச் சுவைபயன்பட்டமை - சுவைப்பொருத்தம் - பொருந்தாச்சுவைகள் - சுவைமாறுபாடும் ஏற்பட்ட காலங்களும் - சுவைகளின் பட்டியல்.

அலகு - 2

ஐம்பூதவகை - நீர்வகைக் குணங்கள் - மழைநீர் - ஆலங்கட்டி மழைநீர் - பனிநீர் - தண்ணீர் - ஆற்றுநீர் - கங்கை, யமுனை, கோதாவரி, துங்கபுத்திரை, நர்மதா, சிந்து, சித்திரா, காவிரி, தாம்பிரபரணி பச்சையாற்று போன்ற நதிகளின் தன்மை

அலகு - 3

குளத்துநீர் - தாமரைக் குளத்துநீர் - அல்லிக் குளத்துநீர் - ஏரிநீர் - சுனை நீர் - கிணற்றுநீர் - ஊற்றுநீர் - பாறைநீர் - சுக்கான் பாறைநீர் - கரும்பாறைநீர் - அருவிநீர் - காட்டுப்பகுதிநீர் - சிவந்தநீர் - கறுத்தநீர் - வயல் நீர் - நண்டுக்குழிநீர் - பாசிநீர் - நீராகாரநீர் - காடி நீர் - உப்புநீர் - சழுத்திரநீர் - நாவல் நீர் - வாழைநீர் - கருங்காலிநீர் - இலவுநீர் - இளநீர்வகைகளும் பயன்களும்

அலகு - 4

வெந்நீர்வகையும் குணமும் - பால் வகையும் குணமும் தயிர்வகை - மோர்வகை - வெண்ணெய் வகை - நெய் வகை - சாணவகை - பாகின் வகை - மதுரவகை - வெல்லத்தின் வகை - சர்க்கரைவகை - கற்கண்டின் வகை - மதுவின் வகை - தேனின் வகையும் மருத்துவப் பயனும்.

அலகு - 5

உணவுயுத்தம் - உணவுவிதிகள் - விவசாயத்தில் பன்னாட்டுநிறுவனங்கள் - பயணியின் உணவு - தமிழர்கள் என்னசாப்பிட்டார்கள் - உணவுப் பொய்கள் - திணைவகையின் பயன்பாடு.

பார்வை நூல்கள்

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2. உணவு யுத்தம் - எஸ். இராமகிருஷ்ணன்
3. ஆயுதகலைகள் - முனைவர் பாக்யமேரி
4. தமிழர் சாஸ்திரம் - ச.வித்தியானந்தம், பாரி புத்தகப் பண்ணை, 1971.
5. சங்ககால வாழ்வியல் - டாக்டர் ந.சுப்பிரமணியன்
6. தமிழர் நாகரிக வரலாறு - பா.இறையரசன்
7. உணவுயுத்தம் - எஸ். இராமகிருஷ்ணன்

Course Name	HINDI - भारतीय व्यंजनों की परंपरा	Programme Name	B.Voc Food Science and Nutrition
Course Code	18BFSNLH01	Academic Year Introduced	2018 - 2019
Type of Course	Theory	Semester	I

Unit/Module Title	Objectives	Learning Outcomes	Hours of Instruction L+Tu+Te=To
इकाई 1	भारतीय खाद्य पदार्थों का इतिहास -परिचय -भारतीय व्यंजनों की विविधता - भारतीय भोजन पर धार्मिक और विदेशी प्रभाव -भारतीय खाद्य पदार्थों पर जलवायु का प्रभाव।	Able to understand the history of food items from ancient India. Able to understand the different types of food materials consumed by Indians. Able to understand the effect of foreign foods in Indian food. Able to understand the influence of climatic factors in the food habits of India.	9 Hrs
इकाई 2	भारतीय भोजन की खपत व्यवस्था - पारंपरिक भारतीय क्षुधावर्धक -नाश्ता -मिठाई - डिजर्ट और पेय पदार्थ -आहार प्रतिबन्ध।	Able to understand various food habits of Indians, such as sweets, appetizer, liquid items, leafy materials, vegetables, flowers, fruits, meat from animals, birds, fishes, crabs etc.,	9 Hrs
इकाई 3	भारतीय व्यंजनों की क्षेत्रीय विविधता - प्रवासी भारतियों का भोजन एवं संलयन भोजन- व्यंजन जो भारत में आए-भारतीय व मगद्वीपीय व्यंजनों में अंतर।	Able to understand the availability of different types of vegetables in various regions of India. Able to understand the consumption of different food items in morning, noon, evening and night times. Able to understand various modes of food consumption like the items used for eating, used as snacks, used as drinks, consumed by licking etc., Able to understand the food items consumed by poor, used to offer food to God.	9 Hrs
इकाई 4	में भोजन की बर्बादी -उत्सवों में बर्बादी -बर्बाद भोजन से ऊर्जा निर्माण -खाद्य संकट में गंभीर निहितार्थ - खाद्य अपव्यय को काम करने में सरकार की पहल।	Able to understand the different types of food spoilage. Able to understand the believes related to food and their consumption. Able to understand the food items consumed by various people like rich, poor, female, bramins, widows, soldiers, during fasting etc.,	9 Hrs

		Understanding the status food in day-to-day life.	
इकाई 5	खाद्य संरक्षण की परंपरागत तकनीके -सुखाना -ठंडा करना -जमाना -उबालना -गर्म करना -रेह (नमक लगाना) - शक्कर लगाना - धुँआ देना -आचार डालना	Able to understand the various methods of food storage and food processing to prevent food from its spoilage.	9 Hrs
Total Hours of Instruction			45 Hrs

Course Name	Science and Handling of Raw Materials	Programme Name	B.Voc Food Science and Nutrition
Course Code	18BFSNC01	Academic Year Introduced	2018 - 2019
Type of Course	Theory	Semester	I

COURSE OUTCOMES

On completion of the course, the students will be able to

C01:	Recognize problems during storage and transportation
C02:	Assess the quality of goods
C03:	Differentiate the uses and learn harvesting practices
C04:	Describe the uses and assess production trend
C05:	Interpret techniques for storage and transportation
C06:	Distinguish the types and compare storage conditions and inspection.

Mapping of COs with POs, PSOs

COs / POs & PSOs	PO(T)	PO(E)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PO(A)	PSO1	PSO2	PSO3
C01	3	3	2	3	3	3	3	2	3	3	3
C02	3	3	2	3	3	3	3	2	3	3	3
C03	3	3	2	3	3	3	3	2	3	3	3
C04	3	3	2	3	3	3	3	2	3	3	3
C05	3	3	2	3	3	3	3	2	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction L+Tu+Te=To
Cereals, Pseudo cereals, Millets and Pulses	To identify types, production, storage and uses	7+1+1=9
Fruits and Vegetables	To identify types and learn post harvesting practises	7+1+1=9
Nuts & Oilseeds	To compare and distinguish the production trend and harvesting practises	7+1+1=9
Spices & Condiments	To identify the uses and learn production trend and harvesting practices	6+1+1=8
Milk & Egg	To learn about the production, storage, uses and transportation	6+1+1=8
Fleshy Foods (Meat, poultry & Sea foods)	To identify the types and compare the storage techniques	7+1+3=11
Total Hours of Instruction		54 (18*3)

L-Lecture, Tu-Tutorial, Te-Tests, To-Total Hours

COURSE PLAN

Unit/Chapters	Intended learning Outcomes	CO(s) Mapped	Cognitive Level/KD	Psychomotor domain activity	Psychomotor domain level
UNIT I: Cereals, Pseudo cereals, Millets and Pulses					
1.	Production trend, Classification Distribution channels	C01	K1,F	Identify the types and assess the household purchasing trend and diversity	K3,S2

2.	Domestic and Industrial use	CO1	K1,C	Demonstrate the use of Cereals by creating pamphlets/charts	K3, S3
3.	Structure and Nutritive value and Composition	CO1	K2,C	Create a dummy model of grains and display their parts	K6, S3
4.	Storage structure and methods; Government initiatives for food storage; Requirements for safe storage	CO1	K2,C	Visit any Food Corporation of India – grain Storage Godown	K5, S5
UNIT II: Fruits and Vegetables					
5.	Production trend, Classification, Domestic and Industrial uses; Structure and Nutritive value	CO2	K1,C	Collect and display different types of fruits and vegetables Identify the nutritive value of fruits and vegetables	K4,S3
6.	Harvesting practices, tools and containers	CO2	K2,C	Create a Model of Different harvesting tools and containers	K6,S3
7.	Storage conditions, structures and methods/ techniques, Government initiatives for food storage	CO2	K2,C	Draw the Layout of Different Storage area of Fruits and Vegetables	K6,S3
8.	Transport mode and methods; Distribution channels	CO2	K2,C	<ul style="list-style-type: none"> Collect Pictures representing different modes of transport of fruits and vegetables Visit a Government Distribution Centre (Uzhavar Santhai) and Submit a report 	K5,S5
9.	Batch inspection and Quality checking of distributed goods	CO2	K2,C	Inspect the quality of Raw Materials and submit a Quality Analysis report	K5,S3
UNIT III: Nuts & Oilseeds					
10.	Production trend; Types; Structure and Nutritive value; Domestic and Industrial uses	CO3	K2,P	Collect and Identify Samples of Different nuts and oilseeds and display with Nutritive Value	K2,S2
11.	Collection Techniques/ Harvesting methods	CO3	K2,P	Create a Model of Different harvesting tools and containers	K6,S3
12.	Storage condition, structures and methods/ techniques; Government initiatives for food storage	CO3	K2,P	Draw the Layout of different Storage area of nuts and oilseeds	K6,S3
13.	Transport mode and methods Distribution channels	CO3	K2,P	Collect Pictures representing different modes of transport of nuts and oilseeds Visit a Government Distribution Centre and Submit a report	K4,S3
14.	Batch inspection and Quality checking of distributed goods	CO3	K4,MC	Inspect the quality of Raw Materials and submit a Quality Analysis report	K5,S3
15.					
UNIT IV: Spices & Condiments					

16.	Production trend; Structure and Nutritive value; Classification of Spices & Condiments	C04	K2,C	Collect and Identify Samples of different Spices and Condiments and display with Nutritive Value (Model Display)	K2,S3
17.	Harvesting techniques/methods	C04	K2,C	Create a Model of Different harvesting tools and containers	K6,S3
18.	Domestic and Industrial uses	C04	K2,C	Collect paper cuttings/journal articles/Newsletters regarding the benefits different spices and condiments	K4,S4
19.	Storage condition, structures and methods/ techniques	C04	K2,C	Draw the Layout of different Storage Methods of Spices and Condiments	K3,S3
20.	Government initiatives for food storage; Transport mode and methods; Distribution channels	C04	K2,C	Illustrate on the transportation methods and storage techniques of spices Visit a farm or plantation region of any spice and report on the harvesting, preprocessing, transportation and Storage of Spice or Condiment	K5,S5
21.	Batch inspection and Quality checking of distributed goods	C04	K5,MC	Inspect the quality of Raw Materials and submit a Quality Analysis report	K5,S3
UNIT V: Milk & Egg					
22.	Production trend; Types; Composition and nutritive value	C05	K2,C	Create a model of different types of eggs and display	K6,S2
23.	Domestic and Industrial uses	C05	K2,C	Collect paper cuttings/journal articles/Newsletters regarding the benefits of Milk and Egg	K3,S3
24.	Storage condition, structures and methods/ techniques	C05	K2,C	Draw the Layout of different Storage Methods of Eggs Visit a Milk Collection and Storage Centers and submit a report	K3,S3 and S5
25.	Transport mode and methods; Distribution channels	C05	K2,C	Draw a flow chart about the distribution channel of Egg and Milk	K3,S3
26.	Batch inspection and Quality checking of distributed goods	C05	K2,MC	Demonstrate the Quality of Egg using different Quality Assessment Criteria Demonstrate on the adulteration test for Milk	K5,S3
UNIT VI: Fleshy Foods (Meat, poultry & Sea foods)					
27.	Production trend; Types; Domestic and Industrial uses Batch inspection and Quality checking of distributed goods	C06	K2,C	Draw a graph/pie chart on the recent production trend of fleshy foods in India	K3,S3

28.	Structure and Composition; Nutritive value; Cuts and grades	CO6	K2,C	Create a model of different cuts of Fleshy foods (Meat, Poultry and Sea Foods)	K6,S3
29.	Storage condition, structures and methods/ techniques; Transport mode and methods; Distribution channels	CO6	K2,C	Draw the layout of Cold Storage of Fleshy Foods	K3,S3

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2	Potter , Norman N., Hotchkiss , Joseph H, Food Science, 5 th Edition, Springer Publication.

REFERENCE BOOKS

1	Avantina Sharma, (2010), Textbook of Food Science & Technology, Second Revised Edition, International Book Distributing Company
2	Sumati Rajagopal Mudambi , Shalini M. Rao , M. V. Rajagopal . (2015), Food Science, New Age International (P) Limited, Publishers.
3	FAO - Training Manual No.17/2. 2007. Prevention of post harvest food losses: Fruits, Vegetables and Root crops. Daya Publishing House, Delhi.
4	Swaminathan, M. 1988. Hand book of Food Science and Experimental Foods. Bappco publishers, Bangalore.
5	Vijay, K. 2001. Text Book of Food Sciences and Technology. ICAR, New Delhi.

JOURNALS AND DOCUMENTS

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2	Annals. Food Science and Technology, Valahia University Press
3	Food Science and Human Wellness, Beijing Academy of Food Sciences
4	Journal of Food, Agriculture and Environment, WFL Publisher Ltd.

Course Name	Food Science and Chemistry Practical I	Programme Name	B.Voc. Food Science and Nutrition
Course Code	18FSNA01	Academic Year Introduced	2018 - 19
Type of Course	Practical	Semester	I

COURSE OUTCOMES

On completion of the course, the students will be able to											
CO1:	Recognize different types of food items available										
CO2:	Demonstrate physical verification tests for foods										
CO3:	Perform quality estimation tests and assess selection criteria										
Mapping of COs with POs, PSOs											
COs / POs & PSOs	PO(T)	PO(E)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PO(A)	PSO1	PSO2	PSO3
CO1	1	3	2	3	3	3	3	3	3	3	3
CO2	1	3	2	3	3	3	3	3	3	3	3
CO3	1	3	2	3	3	3	3	3	3	3	3
1 – Slight, 2 – Moderate, 3 – Substantial											

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction Tu+P+Te=To
CO1:	To gain knowledge on the types of foods	
CO2:	To assess purchasing trend and selection criteria	
CO3:	To interpret food item quality	
Total Hours of Instruction		

Tu-Tutorial, P-Practical, Te-Tests, To-Total Hours

COURSE PLAN

Module/Experiment No.	Intended learning Chapters	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
MODULE I Cereals, Pseudo cereals, Millets and Pulses					
1.	Identification of the types	CO1	K4, P	Create a chart displaying cereals, pseudo cereals and millets with its scientific, colloquial and English names	S3
2.	Assessment of household purchasing trend and diversity	CO2	K4, P	Examine the consumption pattern of food commodities in their household and distinguish it using a bar chart	S2
3.	Quality analysis of raw material under storage: a. Physical examination for infestation	CO3	K4, P	Develop a video demonstrating quality verification tests for food sample	S4

	b. Storage condition assessment, Temperature and Relative Humidity				
MODULE II Fruits and Vegetables					
4.	Assessment of household diversity in consumption of fruits and vegetables	C02	K4, P	Examine the consumption pattern of food commodities in their household and distinguish it using a pie diagram	S2
5.	Identification of the types of fruits and vegetables	C01	K4, P	Collect pictures of rarely available fruits and vegetables in our state and give a note on it	S1
6.	Maturity index determination	C03	K4, P	Visit a nearby market and assess the reason for wastage of fruits and vegetables	S3
7.	Physical selection criteria for fresh fruits and vegetables	C03	K4, P	Develop a video content interpreting selection criteria of fruits and vegetables	S3
MODULE III Nuts and Oilseeds					
8.	Assessment of household diversity in consumption of nuts and oilseeds	C02	K4, P	Examine the consumption pattern of food commodities in their household and distinguish it using a graph	S2
9.	Quality checking of raw materials – Physical verification	C03	K4, P	Prepare a document stating the advantages of using nuts and oilseeds in our diet	S1
MODULE IV Spices and Condiments					
10.	Assessment of household diversity in consumption of spices and condiments	C02	K4, P	Examine the consumption pattern of food commodities in their household and distinguish it using a diagram	S2
11.	Quality checking of raw materials - Physical verification	C03	K4, P	Collect and compile data on the usage of spices in your diet.	S2
MODULE V Milk and Egg					
12.	Determination of density and soluble solids in milk	C03	K4, P	Visit nearby milk collecting booth and collect data on quality estimation of milk	S2
13.	Assessment of household diversity in consumption of milk and egg	C02	K4, P	Examine the consumption pattern of food commodities in their household	S2
14.	Egg quality evaluation	C03	K4, P	Visit a poultry farm and reproduce data on quality estimation of egg	S2
MODULE VI Fleshy foods					
15.	Assessment of household diversity in consumption of fleshy foods	C02	K4, P	Examine the consumption pattern of food commodities in their household and distinguish it	S2
16.	Identification of types of	C01		Collect different varieties of	S3

	meat			meat and identify ways to distinguish it	
17.	Selection criteria of fleshy foods	CO3	K4, P	Perform selection criteria techniques for fleshy foods	S2

REFERENCES

TEXTBOOKS	
1	Srilakshmi.,B. (2018), Food Science, 7th edition, New Age International (P) Ltd, Punishers, New Delhi.
2	Colin Wrigley, Ian Batey, Diane Miskelly, (2017), Cereal grains: Assessing and Managing Quality, 2nd Edition, Woodhead Publishing, USA.
REFERENCE BOOKS	
1	Connie M.Weaver and James R Daniel (2017), The food chemistry laboratory: a manual for experimental foods, dietetics and food scientist, 2nd edition.
2	Ashim Kumar Biswas, Prabhat Mandal, (2019), Meat Quality Analysis, 1 st Edition, Academic Press.
3	Ronald Watson, Victor Preed, (2016), Fruits, Vegetables and Herbs, 1st Edition, Academic Press.
JOURNALS AND DOCUMENTS	
1	www.fao.org

Course Name	Yoga and Fitness - Practical	Programme Name	B.Voc. Food Science and Nutrition
Course Code	18FSNV01	Academic Year Introduced	2018 - 19
Type of Course	Practical	Semester	I

COURSE OUTCOMES:

On completion of the course, the students will be able to

C01: Perform the different postures of yoga

C02: Improve their concentration and breathing

C03: Integrate the moral values and ethics in their life

C04: Imbibe yoga work out lifestyle as a adjunct of Good health and Wellness

C05: Enhance the activities like include academic, sport, heightened awareness and balanced attitude for social activity.

Mapping of COs with POs, PSOs

COs / Pos & PSOs	PO(T)	PO(E)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PO(A)	PSO1	PSO2	PSO3
C01	1	3	2	2	2	2	2	3	2	2	2
C02	1	3	2	2	2	2	2	3	2	2	2
C03	1	3	2	2	2	2	2	3	2	2	2
C04	1	3	2	2	2	2	2	3	2	2	2
C05	1	3	2	2	2	2	2	3	2	2	2

1 – Slight, 2 – Moderate, 3 – Substantial

RUBRICS FOR PRACTICAL:

Assessment Rubrics / Scaling Percentage	Outstanding (81 - 100%)	Good (66 - 80%)	Satisfactory (50 - 65 %)
Conduct of Experiment (20)	Meticulous hands on skill in conducting experiments with clear understanding of principle and procedure	Able to conduct the experiment based on the given procedure	Lack of hands on skill and clarity in conducting experiments
Observation (20)	Excellent interpretation of the objectives and able to obtain accurate results	Good interpretation of the objectives and able to obtain result in tolerance range	Fair in interpreting the objectives and able to obtain result below tolerance range
Record (20)	Exceptional maintenance of records by following appropriate formats and adhering to deadline	Fair maintenance of records by following appropriate formats and submitting slightly beyond deadline	Lack of fair maintenance of record and delayed submission beyond deadline
Viva-voce (15)	Excellent in preparedness, clear delivery and knowledge in application	Good in preparedness, delivery and knowledge in application	Fair in preparedness, delivery and inadequate knowledge in application

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

S. No.	Unit/Module	Objectives	Hours of Instruction L+Tu+Te=To
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1.	Unit - I Standing Postures of yoga	1. Perform the different postures of yoga 2. Imbibe yoga work out lifestyle as a adjunct of Good health and Wellness	6
2.	Unit-II Sitting Postures of Yoga		6
3.	Unit-III Prone Postures of Yoga		6
4.	Unit-IV Supine Postures of Yoga		6
5.	Unit-V Breathing Exercises and Kiriya	1. Improve their concentration and breathing 2. Imbibe yoga work out lifestyle as a adjunct of Good health and Wellness	6
6.	Unit-VI Dharana and Meditation	1. Integrate the moral values and ethics in their life 2. Imbibe yoga work out lifestyle as a adjunct of Good health and Wellness 3. Enhance the activities like include academic, sport, heightened awareness and balanced attitude for social activity.	6

L-Lecture, Tu-Tutorial, Te-Tests, To-Total Hours

OUTCOME BASED EDUCATIONAL ACTIVITIES FOR THEORY:

S. No.	Name of the Activity	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomot or domain level
Unit - I Standing Postures of yoga					
1.	Tadasana (Mountain Pose)	CO1,CO4,	K3,P	1. DEMONSTRATION AND PRACTISE 2. VIDEO PRESENTATION	SI
2.	Arthakatti Chakrasana				
3.	Virabhadrasana III (Warrior III)				
4.	Padhakasthasana				
5.	Artha Chakrasana				
6.	Thirikonasana				
7.	Parivirutha Thirikonasana				
8.	Ukattasana				
Unit-II Sitting Postures of Yoga					
1.	Vajrasana	CO1,CO4,	K3,P	1. DEMONSTRATION AND PRACTISE 2. VIDEO PRESENTATION	SI
2.	Sasangasana				
3.	Pachimottanasaana				
4.	Baddhakonasana				
5.	Artha padmasana				
6.	Padmasana				
Unit-III Prone Postures of Yoga					
1	Maharasana	CO1,CO4,	K3,P	1. DEMONSTRATION AND PRACTISE	SI
2	Dhanurasana				

3	Pujangasana			2. VIDEO PRESENTATION	
4	Salabasana				
Unit-IV Supine Postures of Yoga					
1	Sethubanadasan	CO1,CO2, CO4,	K3,P	1. DEMONSTRATION AND PRACTISE 2. VIDEO PRESENTATION	SI
2	Sarvangasana				
3	Pavanamuktasan				
4	Halasana				
5	Matsyasana				
6	IRT				
7	QRT				
8	DRT				
9	Savasana				
Unit-V Breathing Exercises and Kiriya					
1	Tiger Breathing	CO1,CO2,C03 CO4,	K3,P	1. DEMONSTRATION AND PRACTISE 2. VIDEO PRESENTATION	SI
2	Rabid Breathing				
3	Dog Breathing				
4	Nadi Suthi				
5	Kapabathi				
6	Basthirika				
7	OMM Chanding (AAA, UUUU, MMMM)				
Unit-VI Dharana and Meditation					
1	Yama niyama	CO1,CO2,C03 CO4, CO5	K3,K4,K5	1. DEMONSTRATION AND PRACTISE 2. VIDEO PRESENTATION	SI
2	Dharana				
3	Dhiyana (Meditation)				

REFERENCES

TEXTBOOKS	
1	The Breathing Book: Good Health and Vitality Through Essential Breath Work., by, Donna Farhi , Published November 15th 1996 by Holt Paperbacks
2	Yoga Nidra (The Meditative Heart Of yoga), by Richard Miller , Published on November 30th 2005 by Sounds True Inc (first published November 28th 2005)
3	Medical Therapeutic Yoga, Biopsychosocial rehabilitation and wellness care, Ginger GARNER ,
4	Yoga Therapy: A Guide to the Therapeutic Use of Yoga and Ayurveda for Health and Fitness – December 14, 2004, by A.G. Mohan (Author), Indra Mohan (Author), Ganesh Mohan (Author), Nitya Mohan (Author)
REFERENCE BOOKS	
1	Bhandev, 'Yoga Vidya', Rajkot : Pravin Prakashan.2000.
2	Yadav Yogacharya Hansraj, „Yoga for Students', Bombay: Vhora & Co. Publishers, 1973.
4	PRINCIPLES AND METHODS OF YOGA THERAPY (Compilation), January 2007, Publisher: Dhivyananda Creations, Authors Ananda Balayogi Bhavanani

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1	Broan, R.P., et.al., "Sudarshan Kriya Yogic Breathing in the Treatment of Stress", Journal of Alternative and Complement Medicine, 11.4 (2005): 711-7.
2	Dalal, Geeta "Positive Health through Yoga." Paper Presented in The International Conference on "Yoga Research and Value Education", Held at Kaivalya Dhama, Lonavla (India), (Dec. 2002): 28-31.
3	Gajjar, Nilesh "Effect of Yoga Exercises on Achievement, Memory and Reasoning Ability", International Journal for Research in Education, December: 2012, 1:1, 34-53.

Course Name	Hindi II	Programme Name	B.Voc. Food Science and Nutrition
Course Code	18BFSNLH02	Academic Year Introduced	2018-2019
Type of Course	Theory	Semester	II

प्राचीन भारतीय खाद्य प्रणाली और चिकित्सा के गुण

इकाई – 1

छह प्रकार के स्वादिष्ट- मीठा-"Tutari"- फल- कटहल- केला- गन्ना-शहद- नमक- तीखे- कड़वा- कसैले- खट्टा- भोजन के समुचित से निपटने में उनकी भूमिका है- स्वादिष्ट भोजन-बेस्वादिष्ट- समय की विकृत स्वाद- महत्वपूर्ण छह खनिज /

इकाई – 2

दुनिया के पांच तत्व - जल श्रेणियाँ- वर्षा जल- बर्फ के पानी- पानी- नदी के पानी- गंगा नदी का पानी- यमुना नदी का पानी- गोदावरी नदी का पानी-tunkapattira नदी का पानी- नर्मदा नदी का पानी- सिंधु नदी - चित्रा नदी-कावेरी नदी का पानी-तामिराबरानी नदी का पानी- नदी के गुण/

इकाई – 3

लोटस पूल के पानी- झील का पानी- वसंत पानी- स्प्रिंग जल- राँक पानी- चट्टान पानी- फॉल्स पानी- लाल पानी- काला पानी- धान के पानी- केकड़ा गड़दे पानी-मॉस पानी-पीने का पानी-नमकीन के पानी -सागर के पानी- केले के पानी- आबनूस पानी-नारियल-नारियल पानी के प्रकार/

इकाई – 4

गर्म पानी के प्रकार और गुण-दूध के प्रकार और गुण-दही के प्रकार- छाछ के प्रकार- मक्खन के प्रकार - घी के प्रकार-गोबर के प्रकार - गुड़ के प्रकार- मदुरा श्रेणी के प्रकार- चीनी के प्रकार-मिश्रि के प्रकार – शराब के प्रकार - शहद के प्रकार- औषधीय के गुण /

इकाई – 5

खाद्य लड़ाई- खाद्य नियम-कृषि के क्षेत्र में बहुराष्ट्रीय कंपनियों को-यात्रियों का भोजन- खाद्य झूठ-तिणो के प्रकार और उपयोग

Course Name	Food Processing I	Programme Name	B.Voc. Food Science and Nutrition
Course Code	18BFSNC02	Academic Year Introduced	2018-2019
Type of Course	Theory	Semester	II

COURSE OUTCOMES:

On completion of the course, the students will be able to

CO1:	Summarize and understand the processing techniques available for food items and utilization of by-products
CO2:	Differentiate milling techniques and describe fermented products
CO3:	Describe the extraction methods and identify the uses of hydrogenated products
CO4:	Interpret microencapsulation techniques

Mapping of COs with POs, PSOs

COs / Pos&PSOs	PO(T)	PO(E)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PO(A)	PSO1	PSO2	PSO3
CO1	3	2	3	2	3	3	2	3	3	3	3
CO2	3	2	3	2	3	3	2	3	3	3	3
CO3	3	2	3	2	3	3	2	3	3	3	3
CO4	3	2	3	2	3	3	2	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction L+Tu+Te=To
Cereals	To identify the processing techniques and utilization of by products	10
Milletts	To distinguish the milling methods	10
Pulses and Legumes	To recall the utilization of fermented food products	12
Nuts and oilseeds	To interpret the usage of by products	10
Spices and Condiments	To understand the manufacturing of spice oil and its utilization	12
Total Hours of Instruction		54

L-Lecture, Tu-Tutorial, Te-Tests, To-Total Hours

COURSE PLAN:

S. No.	Intended learning Outcomes	CO(s) Mapped	Cognitive Level/ KD	Psychomotor domain activity	Psychomotor domain level
UNIT I –Cereals					
1.	Paddy and its handling – cleaning, drying and equilibrium moisture content	CO1	K2, F	Visit any rice processing industry and submit the report	K2, S2
2.	Rice – milling, parboiling, polishing and ageing	CO1	K2, C		
3.	Byproducts of milling and grades of rice	CO1	K2, C		
4.	Rice products – quick cooking rice, parched rice, instant rice, canned and frozen rice, puffed rice and extruded rice, shredded rice	CO1	K2, F	Visit to a super market and gather information on the availability of rice products and present the data	K4,S2
5.	Baby foods, rice cake, rice crispies and rice starch	CO1	K1, F		
6.	Wheat – milling, by-products of milling – atta,	CO1		Collect pictures or	K1, S1

	maida, rava, bran and germ		K2, C	videos about milling of wheat and display it in the class room	
7.	Wheat products – bread, biscuits, cookies, pasta and noodles	CO1	K2, F	Visit to a super market and gather information on the availability of wheat products and present the data	K4, S2
8.	Corn, oats and barley – milling, by-products and flaked products	CO1	K2, F		
9.	Malting of cereals	CO1	K2, C		
	UNIT II – Millets				
10.	Millets – milling	CO1	K2, C	Conduct a survey on the awareness and utilization of millets in your locality	K4, S3
11.	By-products of milling	CO1	K2, C		
12.	Processed products from millets	CO1	K2, C		
	UNIT – III Pulses and Legumes				
13.	Milling – wet & dry milling; commercial milling	CO2	K2, C	Pictorial representation of milling techniques	K1, S1
14.	Dehulling – methods; pretreatment – wet treatment, soaking, chemical treatment, dry treatment, oil and heat treatment	CO2	K2, C		
15.	Germination, fermentation, roasting, parching, extrusion, parboiling, agglomeration	CO2	K2, C		
16.	Fermented products – idli, dosa, soya curd, textured vegetable protein, soya sauce, tempeh, natto and miso; quick dhal and instant dhal	CO2	K2, C	Assess the frequency of purchase of fermented products in your house	K4, S2
	UNIT – IV Nuts and oilseeds				
17.	Post harvest technology – handling, drying, storage, grading, pretreatments – cleaning, dehulling, size reduction and flaking, heat treatment	CO3	K2, C	Industrial visit to oil processing mill and collect data on modern milling techniques and traditional milling techniques	K4, S1
18.	Oil extraction- rendering, traditional methods – ghani, power ghani, hydraulic press, expellers	CO3	K2, C		
19.	Solvent extraction – principle, pretreatment, extraction and desolventisation	CO3	K2, C		
20.	Refining of oil – degumming, neutralization, bleaching, filtration, deodorization and winterization	CO3	K2, C	Conduct a survey in the housing area or your college or dept to assess consumer's awareness on by products and its utilization	K4, S2
21.	Hydrogenation and products based on hydrogenation	CO3	K2, C		
22.	High protein products – oilseed cakes, protein concentrated and isolates	CO3	K2, C		
	UNIT – V Spices and Condiments				
23.	Cleaning, grading and milling of spices	CO1	K2, C	Visit a market and collect pictures of spice products. Identify the uses of spice oil in Indian cookery	K5, S4
24.	Preparation of spice powders and spice oil	CO1	K2, C		
25.	Oleoresins and microencapsulated products	CO4	K2, C		

Note: Content beyond syllabus if any may be included.

REFERENCES

TEXTBOOKS	
1	Srilakshmi B, Food Science, New Age International P Limited Publishers, New Delhi, 2018
2	Chakraverty, Post Harvest Technology of Cereals, Pulses and Oilseeds, Oxford and lbh Publishing, 2019
3	Avanita Sharma, Textbook of Food Science and Technology, CBS Publication, 2017
REFERENCE BOOKS	
1	The Complete Book on Spices and Condiments (with Cultivation, Processing and Uses), Asia Pacific Business Press Inc. 2013
2	Richard P Hamilton and Wolf Hamm, Edible Oil Processing, Oxford University Press, 2004
JOURNALS AND DOCUMENTS	
1	Journal of Food Processing and Preservation,
2	International Journal of Food Properties
3	Journal of Spices and Aromatic Crops
4	Ecoursesonline.iasri.res.in
5	www.fao.org

Course Name	Food Science and Chemistry Practical II	Programme Name	B.Voc. Food Science and Nutrition
Course Code	18FSNA02	Academic Year Introduced	2018 - 19
Type of Course	Practical	Semester	II

COURSE OUTCOMES

On completion of the course, the students will be able to												
CO1:	Infer the benefits of physical and functional properties of cereals											
CO2:	Analyze the cooking quality of foods items and the physio chemical changes behind it											
CO3:	Summarize the benefits of pre preparation techniques like soaking, marinating etc.											
Mapping of COs with POs, PSOs												
COs / POs & PSOs	PO(T)	PO(E)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PO(A)	PSO1	PSO2	PSO3	PSO4
C01	1	3	3	3	3	3	3	3	3	3	3	3
C02	1	3	3	3	3	3	3	3	3	3	3	3
C03	1	3	3	3	3	3	3	3	3	3	3	3
1 – Slight, 2 – Moderate, 3 – Substantial												

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction Tu+P+Te=To
CO1:	To outline the important properties of food items	18
CO2:	To recognize the science behind the cooking methods of foods	18
CO3:	To assess different components in food items and its role	18
Total Hours of Instruction		54

Tu-Tutorial, P-Practical, Te-Tests, To-Total Hours

COURSE PLAN

Module/Experiment No.	Intended learning Chapters	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
MODULE I Cereals, Pseudo cereals, Millets and Pulses					
18.	Physical properties I. Bulk density II. Determination of sedimentation power of flour III. Determination of gluten content of wheat flour	CO1	K2, P	Prepare a scrap book depicting the uses of gluten	S2
19.	Functional Properties I. Water Absorption capacity II. Oil absorption capacity	CO1	K2, P	Interpret the benefits of performing functional properties tests in food items with a supporting	S3

				document	
MODULE II Fruits and Vegetables					
20.	Effect of cooking on pigments of fruits and vegetables	C02	K2, P	Develop a chart work or word wheel showing the pigments responsible for characteristics colour in fruits and vegetables	S4
21.	Prevention of browning reaction in fruits and vegetables	C03	K3, P	Collect pictures in your household showing the development and prevention of browning in fruits and vegetables	S4
MODULE III Nuts and Oilseeds					
22.	Effect of soaking and cooking quality of nuts and oil seeds	C02	K2, P	Identify the benefits of soaking of nuts and oil seeds	S1
MODULE IV Milk and Egg					
23.	Determination of casein content of milk	C03	K2, P	Compare the components - SNF, fat, water in different types of milk	S2
24.	Effect of cooking time on egg protein coagulation	C02	K2, P	Examine the benefits of cooking egg and different cooking methods adopted	S1
MODULE V Fleshy foods					
25.	Effect of marinating and enrobing on cooking quality of meat	C02	K2, P	Point out the advantages of marination	S1

REFERENCES

TEXTBOOKS	
1	Srilakshmi, B. (2018), Food Science, 7th edition, New Age International (P) Ltd, Punishers, New Delhi.
2	Avantina Sharma (2017), Textbook of Food Science and Technology, 3 rd edition, CBS Publications.
REFERENCE BOOKS	
1	Sergio O.Serna Saldivar (2010), Cereal Grains – Properties, Processing and Nutritional Attributes, 1 st edition, CRS Press.
2	Atherton HV, Newlander JA, (2003), Chemistry and Testing of Dairy Products, 4 th edition, CBS Publishers and Distributors
JOURNALS AND DOCUMENTS	
1	International journal of Food Science
2	Journal of Food Science and Technology, Springer
3	Journal of Agricultural and Food Chemistry

Course Name	Environmental Studies	Programme Name	B.Voc. Food Science and Nutrition
Course Code	18BFSNV02	Academic Year Introduced	2018-2019
Type of Course	Theory	Semester	II

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1:	Gain the Knowledge about the Scope and Need of public awareness of the Environmental Studies
CO2:	Identify the Renewable and Non-Renewable Resources and use the resources for sustainable lifestyles.
CO3:	Practice the ecological Waste Management in their Industry
CO4:	Gain knowledge about the Biodiversity and its Conservation
CO5:	Identify the major/Minor Pollutant about the different Ecosystem

Mapping of COs with POs, PSOs

COs / POs & PSOs	PO(T)	PO(E)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PO(A)	PSO1	PSO2	PSO3
CO1	3	1	2	1	2	1	2	3	2	2	2
CO2	3	1	2	1	2	1	2	3	2	2	2
CO3	3	1	2	1	2	1	2	3	2	2	2
CO4	3	1	2	1	2	1	2	3	2	2	2
CO5	3	1	2	1	2	1	2	3	2	2	2

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction L+Tu+Te=To
The Multidisciplinary Nature of Environmental Studies	Gain the Knowledge about the Scope and Need of public awareness of the Environmental Studies	7
Natural Resources Renewable and Non-renewable Resources	Identify the Renewable and Non-Renewable Resources and use the resources for sustainable lifestyles.	7
Ecosystems: Concept of an ecosystem	Identify the major/Minor Pollutant about the different Ecosystem	7
Biodiversity and Its Conservation	Gain knowledge about the Biodiversity and its Conservation	7
Environmental Pollution	Handle and Manage the Different types Pollution in their Industry	8
Total Hours of Instruction		36

L-Lecture, Tu-Tutorial, Te-Tests, To-Total Hours

COURSE PLAN

Unit/ Chapters	Intended learning Outcomes	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
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UNIT-I - Multidisciplinary Nature of Environmental Studies:					
1.	The Definition, scope and importance Need for public awareness	CO1	K2,F	Power point presentation and Discussion about the need , Scope, importance and Awareness of the Environmental studies	S1
Unit- II Natural Resources Renewable and Non-renewable Resources					
2.	Natural resources and associated problems - Role of an individual in conservation of natural resources - Equitable use of resources for sustainable lifestyles.	CO2	K2,F	Power point presentation, Video clip about the Resources and its sustainability in the word	S1
Unit-III Ecosystems:					
3.	Structure and function of an ecosystem	CO3	K1,K2,K3, P	Power Point Presentation and Discussion, Industrial Visit	S2
4.	Producers, consumers and decomposers. Energy flow in the ecosystem. Ecological succession				
5.	Food chains, food webs and ecological pyramids.				
6.	Introduction, types, characteristic features, structure and function of the following ecosystem: (a) Forest ecosystem				
7.	(b) Grassland ecosystem				
8.	(c) Desert ecosystem				
9.	(d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estauries)				
Unit- IV- Biodiversity and Its Conservation:					
10.	Introduction, definition: genetic, species and ecosystem diversity	CO4	K2,K3, F	Power Point Presentation and Discussion,	S1
11.	Bio geographical classification of India..				
12.	Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values				
13.	Hot-spots of biodiversity.				
14.	Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India				
Unit-V- Environmental Pollution					
15.	Definition - Causes, effects and control measures of (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards	CO5	K2,K3,K4	Power Point Presentation and Discussion, Industrial Visit	S2

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1.	14th International Conference on Renewable & NonRenewable Energy Woodrow Clark University of California, USA, E-mail: wwclark13@gmail.com , Clark W, J Biodivers Manage Forestry 2020, 9:3
2.	Offshore Floating Renewable Energy and the Future of Power to Fuel Technology Roy Robinson* and Georg Engelmann Excipio Energy Inc., Houston, Texas, USA , Robinson and Engelmann, Expert Opin Environ Biol 2020, 9:2 DOI: 10.37532/eoeb.2020.9(2).160
3.	Potentially toxic elements pollution, source apportionment and ecological risk assessment in soils of agricultural and industrial areas, Bandar Abbas -J Pollut Eff Cont 2018, Volume: 06 10.4172/2375-4397-C1-012, South of Iran, 5th Global Summit and Expo on Pollution Control, October 25-27, 2018.

Course Name	Core III - Food Processing II (Technology Of Fruits And Vegetables, Sugar And Salt)	Programme Name	B.Voc. Food Science and Nutrition
Course Code	18BFSNC03	Academic Year Introduced	2018 - 19
Type of Course	Theory	Semester	III

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1:	Recognize Moisture content during processing and minimally processed product
CO2:	Distinguish the types, preservation in various methods and SOP
CO3:	Differentiate the types and standard methods
CO4:	Identify the chemicals, methods and products
CO5:	Distinguish the types and preparation of sugar products
CO6:	Distinguish the types, role and preparation of salt

Mapping of COs with POs, PSOs

COs / POs & PSOs	PO(T)	PO(E)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PO(A)	PSO1	PSO2	PSO3
CO1	3	3	2	3	2	3	2	3	3	3	3
CO2	3	3	2	3	2	3	2	3	3	3	3
CO3	3	3	2	3	2	3	2	3	3	3	3
CO4	3	3	2	3	2	3	2	3	3	3	3
CO5	3	3	2	3	2	3	2	3	3	3	3
CO6	3	3	2	3	2	3	2	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction L+Tu+Te=To
Fruits and Vegetables	To know about the moisture content, methods, processing of the products.	4+0+1=05
Preservation Methods	To know about the Canning and preservation techniques used by the varies Temperature	6+1+1=08
Preservation by Drying and Dehydration	To identify the types, methods and Differentiate by drying and Dehydration	7+1+1=09
Preservation by Sugars	To study about the Quality, types, methods and preparation by using the Standards	9+1+2=12
Preservation by Chemicals, Salts and Acids	To know about the permitted chemicals, types and methods of the products	8+1+2=11
Sugar	To identify the types and preparation methods of sugar and its products	4+1+0=05
Salt	To differentiate the types and composition of Brine solution	3+0+1=04
Total Hours of Instruction		54 (18x3)

L-Lecture, Tu-Tutorial, Te-Tests, To-Total Hours

COURSE PLAN

Unit/Module	Intended learning Outcomes	CO(s) Mapped	Cognitive Level /	Psychomotor domain activity	Psychomotor domain level
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			KD		
UNIT 1: Fruits and Vegetable Processing					
1.	Water activity and fruit spoilage	CO1	K1, F	Exemplify the water content and Water activity of foods in our routine diet	K5, S1
2.	Intermediate moisture fruits and vegetables – principle, methods and products.	CO1	K1, F	List out the Intermediate moisture fruits and vegetables	K5, S1
3.	Minimally processed fruits and vegetables-Selection criteria, Temperature, Storage Period	CO1	K2, P	Display Minimally processed fruits and vegetables and determine its Selection criteria, Temperature and Storage Period	K3, S1
UNIT 2: Preservation Methods					
4.	Preservation by use of high temperature- Pasteurization, sterilization, canning – principles, steps involved and advantages, defects in canning and spoilage of canned foods.	CO2	K2, C	Prepare a scrap book of Preservation process by using high temperature	K6, S3
5.	Preservation by use of low temperature - Refrigeration – principles, refrigerants, changes in refrigerated food, factors affecting the quality of refrigerated products, spoilage of refrigerated products and maintenance of refrigerator.	CO2	K2, C	Prepare a scrap book of Preservation process by using low temperature	K6, S3
6.	Preservation by use of very low temperature- Freezing – principle and steps in freezing, methods and types of freezing, advantages and disadvantages, frozen products.	CO2	K2, C	Prepare a scrap book of Preservation process by using very low temperature	K6, S3
UNIT 3: Preservation by Drying and Dehydration					
7.	Preservation by drying and dehydration – difference between drying and dehydration,	CO2	K2, C	Differentiate drying and dehydration of the products	K4, S2
8.	preparation of food for drying, methods of drying, types of drier, methods of dehydration,			Prepare dried or dehydrated product using fruits and vegetables	K4, S2
9.	Dried and dehydrated products.			Exemplify the dried foods in our routine diet	K5, S1
UNIT 4: Preservation by Sugars					
10.	Preservation by sugar – principle of gel formation, method of preparation, FSSAI,	CO3	K2, P	Differentiate the Preservation of sugar products by using various	K4, S2

	AGMARK, and ISO standards for Jam, Jelly, marmalade, candy, preserve,			standards	
11.	Unfermented fruit beverages – Squash, RTS beverages, cordial, syrup, fruit Juice concentrate.	CO3	K2, P	Design the pamphlet for preparation methods of Unfermented fruit beverages	K5, S4
UNIT 5: Preservation by Chemicals, Salts and Acids					
12.	Preservation by chemicals – principle, permitted chemical preservative in food processing, clarification of fruit Juices	CO4	K2, P	Systematic literature review presentation on permitted chemical preservative in food processing	K2, S2
13.	Application in value added fruits and vegetable products.	CO4	K2, P	Criticize on different value added fruits and vegetable products.	K4, S4
14.	Preservation by salts and acids – principle, pickle, sauce and ketch up.	CO4	K2, P	Sketch the types of pickle, pickle, sauce and ketch up available in the market	K3, S1
Unit-6: Sugar					
10.	Sugars- types and sources	CO5	K1, F	Tabulate the kinds of sugar as per its sources	K3, S3
11.	Methods of preparation of sugars, jaggery, khandsari, raw and refined sugar, principles of sugar cookery.	CO5	K2, P	Differentiate the methods of sugar	K4, S2
12.	Confectionery - history, types, classification, role of sugar in confectionery, role of chemical additives in confectionery.	CO5	K1, F	Differentiate the role of sugar in confectionery, role of chemical additives in confectionery	K4, S2
13.	Preparation of caramel, toffee, candy, chewing gum, bubble gum and chocolates.	CO5	K2, P	Infer about the crystalline and non-crystalline candies in the market	K4, S3
Unit-7: Salt					
14.	Types of salt, uses of salt	CO6	K1, C	Interpret on each type of salt	K5, S4
15.	Brine, preparation of brines	CO6	K1, C	Demonstrate the preparation of brine Solution	K3, S1
16.	Composition of brines used in canning, pickling and curing.	CO6	K1, C	Demonstrate the any one product Preservation by salts and acids	K3, S1

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2	Journal of Food Process Engineering, Wiley- Blackwell
3	Trends in Food Science and Technology, Elsevier
4	Fruits and Vegetable journals- OMICS International

Course Name	Core III - Food Processing III	Programme Name	B.Voc. Food Science and Nutrition
Course Code	18BFSNC04	Academic Year Introduced	2018 - 19
Type of Course	Theory	Semester	III

COURSE OUTCOMES

On completion of the course, the students will be able to

CO1:	Define the Raw Milk handling process, types of milk and its by products
CO2:	Appraise the knowledge on preservation, cleaning and various treatment of egg processing
CO3:	Understand the concepts, preservation techniques involved in the processing of fleshy foods and its products
CO4:	Infer the handling process, chemical treatment and Value added Fish and marine products

Mapping of COs with POs, PSOs

COs / POs & PSOs	PO(T)	PO(E)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PO(A)	PSO1	PSO2	PSO3
CO1	3	3	2	3	2	3	2	3	3	3	3
CO2	3	3	2	3	2	3	2	3	3	3	3
CO3	3	3	2	3	2	3	2	3	3	3	3
CO4	3	3	2	3	2	3	2	3	3	3	3

1 – Slight, 2 – Moderate, 3 – Substantial

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction L+Tu+Te=To
Milk	To familiarize with different equipments and technologies applied in a dairy plant from the point of reception of milk till it is packed, stored and its products	12+1+3=16
Egg	To learn about processing and preservation technology of egg and its products	10+2+1=13
Fleshy foods	To illustrate the concepts, preservation techniques involved in the processing of fleshy foods and its products	10+1+2=13
Fishes and Marine products	To provide learning on process, chemical treatment and Value added Fish and marine products	09+1+2=12
Total Hours of Instruction		54 (18x3)

L-Lecture, Tu-Tutorial, Te-Tests, To-Total Hours

COURSE PLAN

Unit/Module	Intended learning Outcomes	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
Unit-1 Milk					
1.	Raw Milk handling – Buying and collection of milk, cooling and transportation of milk, receiving, preheating, filtration, clarification, cooling and storage of raw milk.	CO1	K2 F	Systematic literature review presentation on Raw Milk handling process	K2, S2
2.	Milk processing – standardization, pasteurization vacuum	CO1	K2 C	Visit a dairy industry and prepare a report	K3, S2

	pasteurization, homogenization, ultra filtration and reverse osmosis.				
3.	Milk products – cream, butter, butter oil	CO1	K2 P	Develop a milk based snack and Standardize the recipes	K6, S5
4.	special milks – sterilized milk, homogenized milk, soft curd milk, flavoured milk, fermented milk, yoghurt, cheese, ice cream, ghee, Khoa, Chhana, Paneer, Dahi, Shrikhand, Kheer, Rabri, Kulfi and Lassi, casein powder (edible) and milk powder.	CO1	K2 P	Schematize the production of different dairy products	K4, S2
UNIT :2 Egg					
5.	Preservation of shell eggs, egg cleaning, oil treatment, cold storage, thermo stabilisation, immersion in liquids, preservation of albumin and yolk powder production.	CO2	K2 P	Demonstrate the cleaning of egg and preparation method of egg powder	K3, S1
UNIT :3 Fleshy foods					
6.	Preslaughter care requirements, ante mortem examination of animal, slaughtering of meat – scientific methods of slaughter, ritual, religious methods of slaughter, dressing and cutting of carcass in sheep, pig, buffalo and poultry.	CO3	K2 P	Sketch out slaughtering of meat	K5, S1
7.	Post mortem examination of carcass, grading and packaging of meat, post mortem changes in meat, methods of tenderization and factors affecting tenderization.	CO3	K2 P	Demonstrate the methods of tenderization used in fleshy foods	K3, S1
8.	Meat preservation – chilling, freezing, curing, smoking, canning, dehydration, irradiation and hurdle concept.	CO3	K2 P	Prepare a scrap book of various Preservation process of meat by using different temperature	K6, S3
9.	Meat and poultry products – meat emulsion, sausage, patties, roll, loaves, luncheon meats, meat balls, nuggets, fermented sausages, ham and bacon	CO3	K2 P	Prepare and display any one meat and poultry products in your processing laboratory	K3, S2
10.	Indigenous meat products, cured meats, canned products, restricted meat	CO3	K2 P	Schematize the production of different Meat products	K4, S2

	products, sectioned and formed meat products, intermediate moisture meat product.				
UNIT 4: Fishes and Marine products					
11.	Onboard handling – Handling, washing, sorting, Evisceration, removal of gills, bleeding icing, bulking, shelving and boxing	CO4	K2 P	Demonstrate the handling process of fishes and Marine products	K3, S1
12.	Processing – post mortem changes, drying, dehydration, smoking, marination, salting, canning, fermentation, freezing,	CO4	K2 P	Demonstrate the any one processing methods of fish	K3, S1
13.	chemical treatments, low dose irradiation, high pressure treatment, MAP, vacuum packaging, gas packaging, hurdle concept	CO4	K2 P	List out examples of food packaging materials in our daily life	K5, S1
14.	Value added Fish and marine products – minced fish, fish finger, surimi, fish burger, fish protein concentrates, flakes, fish oils, chitin, chitosan, seaweeds, shark fin and fin rays.	CO4	K2 P	Criticize on different value added Fishes and Marine products	K4, S4

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2	Joseph P. Kerry, (2002), Meat Processing, first Edition, ISBN: 9781855735835, Woodhead Publishing
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JOURNALS AND DOCUMENTS	
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2	Meat science, Elsevier
3	Journal of Food Process Engineering, Wiley- Blackwell

Course Name	Food Product Development and Marketing Practical I	Programme Name	B.Voc Food Science and Nutrition
Course Code	18BFSNA03	Academic Year Introduced	2018 - 19
Type of Course	Practical	Semester	III

COURSE OUTCOMES

On completion of the course, the students will be able to											
CO1:	To assess the concepts and ideas in the current trend										
CO2:	To develop innovative food product based of locally available raw materials										
CO3:	To justify the product innovation and cost feasibility										
CO4:	To evaluate the sensory attributes of the developed product										
Mapping of COs with POs, PSOs											
COs / POs & PSOs	PO(T)	PO(E)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PO(A)	PSO1	PSO2	PSO3
CO1	1	3	3	3	3	3	3	3	3	3	3
CO2	1	3	3	3	3	3	3	3	3	3	3
CO3	1	3	3	3	3	3	3	3	3	3	3
CO4	1	3	3	3	3	3	3	3	3	3	3
1 – Slight, 2 – Moderate, 3 – Substantial											

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction Tu+P+Te=To
Survey	To do a market analysis of the existing novel products and availability of the raw materials	10
Product Formulation and Standardisation	To enable the students to develop new product	15
Product assessment	To assess the innovative and feasible aspects of the product	15
Sensory Evaluation	To educate the sensory aspects of the product using hedonic scale	14
Total Hours of Instruction		54

Tu-Tutorial, P-Practical, Te-Tests, To-Total Hours

COURSE PLAN

Module/Experiment No.	Intended learning Chapters	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
Module 1: Survey					
1.	Market survey of existing various products	CO1	K4P	Conduct a Market analysis of ready to serve, ready to cook, ready mix and health mix powders using questionnaire	S3
2.	Raw material availability survey	CO1	K4P	To determine and assess the Availability of raw materials for a	S3

				new product	
Module II: Product Formulation and Standardisation					
3.	Product formulation	CO2	K6P	i. Aim of the product ii. Product formula iii. Equipments and utensils required iv. Manufacturing protocol v. Nutritive value calculation vi. Discussion	S5
4.	Product standardisation	CO2	K5P	To Standardise the finished product in terms of portion size and number of servings	S3
Module III: Product assessment					
5.	Assessment on innovative concept in product	CO3	K5C	To appraise the i. Innovative concept in product formula ii. Innovative concept in manufacturing protocol	S4
6.	Assessment of product feasibility	CO3	K5C	To assess the Financial, technical and marketing perspective by cost calculations and market status	S4
Module IV: Sensory Evaluation					
7.	Sensory evaluation of the new developed product	CO4	K5P	To perform the Subjective and Objective sensory evaluation of the developed product	S3

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Course Name	Food Processing and Preservation Practical I	Programme Name	B.Voc. Food Science and Nutrition
Course Code	18FSNC05	Academic Year Introduced	2018 - 19
Type of Course	Practical	Semester	III

COURSE OUTCOMES

On completion of the course, the students will be able to											
CO1:	Assess and Compare the preparation and quality of non perishable food items available										
CO2:	Recognize the benefits of enrobing and marination of fleshy foods										
Mapping of COs with POs, PSOs											
COs / POs & PSOs	PO(T)	PO(E)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PO(A)	PSO1	PSO2	PSO3
CO1	1	3	3	3	3	3	3	3	3	3	3
CO2	1	3	3	3	3	3	3	3	3	3	3
1 – Slight, 2 – Moderate, 3 – Substantial											

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction Tu+P+Te=To
Module I Non – perishable items	To illustrate the techniques involved in the preparation of non perishable food items	24
Module II – Semi perishable items	To develop innovative products	30
Total Hours of Instruction		54

Tu-Tutorial, P-Practical, Te-Tests, To-Total Hours

COURSE PLAN

Module/Experiment No.	Intended learning Chapters	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
MODULE I - NON - PERISHABLE ITEMS					
1.	Preparation of puffed and popped cereals; papads	CO1	K3 P	Interpret the culinary uses of puffed and popped cereals	K5 S2
2.	Preparation of health mixes	CO1	K3 P	Perform organoleptic evaluation for prepared products using hedonic scale	K5 S3
3.	Preparation of ice cream cone	CO1	K3 P	Identify the cost effective methods for preparing ice cream cones	K2 S1
4.	Preparation of masala powders	CO1	K3 P	Summarize the best packing and storage	K2 S2

				method	
5.	Preparation of ready mixes	C01	K3 P	Conduct paired comparison test for prepared ready mixes	K3 S3
6.	Preparation of extruded products	C01	K3 P	Collect pictures of extruded products consumed worldwide and display it	K6 S1
MODULE II SEMI – PERISHABLE ITEMS					
7.	Preparation of enrobed mix for fleshy foods	C02	K3 P	Examine the benefits of enrobing flesh foods	K4 S2

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2	Extruded Foods (2019), Essen Rivesta - Entwine World and Nutrition, TNAU, Coimbatore.
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JOURNALS AND DOCUMENTS

1	Journal of Meat Science and Technology
2	Journal of Grain Processing and Storage

Course Name	Nutrition Chemistry	Programme Name	B.Voc. Food Science and Nutrition
Course Code	18FSNC05	Academic Year Introduced	2018 - 19
Type of Course	Theory	Semester	III

COURSE OUTCOMES:

On completion of the course, the students will be able											
CO1:	Understand the overall commonalities and differences in structure, function, action and metabolism of macronutrients										
CO2:	Understand the overall commonalities and differences in structure, function, action and metabolism of micronutrients										
CO3:	Identify the physiochemical characteristics and interaction of the different nutrients										
CO4:	Outline the role of water in the maintenance and regulation of the different nutrients and total body function										
Mapping of Cos with Pos, PSOs											
Cos / Pos&PSOs	PO(T)	PO(E)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PO(A)	PSO 1	PSO 2	PSO 3
CO1	3	2	3	3	3	3	3	3	3	3	3
CO2	3	2	3	3	3	3	3	3	3	3	3
CO3	3	2	3	3	3	3	3	3	3	3	3
CO4	3	2	3	3	3	3	3	3	3	3	3
1 – Slight, 2 – Moderate, 3 – Substantial											

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction L+Tu+Te=To
Colloids and Water	To learn about the physiochemical characteristic	3+3+3 = 9
Carbohydrate	To impart the knowledge of physio-chemical properties and metabolism of Carbohydrates	3+3+3 = 9
Protein	To learn the concept of physio-chemical properties and Metabolism of Proteins	3+3+3 = 9
Fat	To learn the concept of physio-chemical properties and Metabolism of fats	3+3+3 = 9
Vitamins	To impart the knowledge of physio-chemical properties and functions of Vitamins	3+3+3 = 9
Mineral, Phytonutrients and Bioactive compound	To impart the knowledge of physio-chemical properties and functions of Minerals, Phytonutrients and Bioactive Compound	3+3+3 = 9
Total Hours of Instruction		54

L-Lecture, Tu-Tutorial, Te-Tests, To-Total Hours

COURSE PLAN

Unit/Chapters	Intended learning Outcomes	CO(s) Mapped	Cognitive Level /	Psychomotor domain activity	Psychomotor domain level
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			KD		
UNIT I Colloids and Water					
8.	Colloids- definition, types & properties & uses in food system.	CO1	K1,K2,K3,F	Classify (with video presentation)the types of Colloids and articulate its uses	K2,S3,S4
9.	Water- Structure, Functions of water, Hydrogen bonding, Types of water in foods, Water content in foods	CO1	K1,K2,K3,F	Make a power point presentationthe functional properties of water	K2,S3,S4
10.	Water activity in foods. Effect of water activity on food safety, Analysis of water and water activity.	CO1	K1,K2,K3,F	Design a poster about the functions and activity of the water Demonstrate the analysis of the water and water activity in the food	K2,K3K4,S4
UNIT II: Carbohydrate					
11.	Classification, Sources, Structure, Functions and its metabolism	CO2	K2,K3, C	With actual samples, give a factual demonstration of the different types of Carbohydrates and use a powerpoint to explain the structure, functions and metabolism	K2,K3,K5,S4
12.	Physio-chemical reactions - Hygroscopicity & Solubility, Optical rotation, Maillard reaction, Caramelization, Gelatinization, Dextrinization and Retrogradation	CO2	K2,K3,P	Using actual food samples and PPT to demonstrate the different characteristics of carbohydrates	K2,K3,K6,S3,S4
13.	Fibre - Classification, Sources, Functional Properties and Uses.	CO2	K2,K3,C	Using powerpoint, actual food samples and infographics, explain the different types of fibre and its uses in the diet	K2,F,S3,S4
UNIT III: Protein					
14.	Classification, Sources, Structure, Functions and Metabolism of Proteins,	CO3	K2,K3,C	Using powerpoint, actual food samples and infographics, explain the different sources, composition and classification of the types of protein and its uses in the diet	K2, F,K4,S4
15.	Physio-chemical reactions of protein in food system- Dissociation, Denaturation, Hydration, Swelling, foam formation & Stabilization.	CO3	K2,K4,P		
16.	Emulsification, Amino acid in Maillard reaction	CO3	K3,C	Powerpoint presentation and discussion of the reactivity and nature of	K3,S3,S4

				proteins.	
UNIT IV: Lipids					
17.	Classification, Sources, Functions and Metabolism of Lipids	CO4	K2,P	Powerpoint presentation and discussion of the classification, physical characteristics, nature and functions of fatty acids	K2, F,K4,S4
18.	Fatty acid – Classification, physical Structure and properties	CO4	K2,P		
19.	Physio-chemical reactions – Isomerisation, Hydrogenation, Inter-esterification, Emulsification, Auto-oxidation and Rancidity.	CO4	K3,C		
UNIT V: Vitamins					
20.	Classification, Sources and functions of Fat solublevitamins in food.	CO5	K2,P	Powerpoint presentation and discussion of the classification, physical characteristics, nature and functions of fat-soluble vitamins	K2, F,K4,S4
21.	Classification, Sources and functions of water solublevitamins in food.	CO5	K2,P	Powerpoint presentation and discussion of the classification, physical characteristics, nature and functions of water-soluble vitamins	K2, F,K4,S4
UNIT VI:Minerals and Phytonutrients					
22.	Classification, Sources and Functions of Minerals in food.	CO6	K2,P	PowerPoint presentation and discussion of the classification, physical characteristics, nature and functions of minerals	K2 F,K4,S4
23.	Classification, Sources and Functions of phyto-nutrients and Bioactive compounds in food.	CO6	K2,P	PowerPoint presentation and discussion of the classification, physical characteristics, nature, uses and functions of phyto-nutrients and Bio-active compounds in foods	K2 F,K4,S4

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2	Iqbal, S.A., Mido, Y., "Food Chemistry" Discovered Publishing Houses, New Delhi, 2005.
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2	<u>The Journal of Nutritional Biochemistry</u> , Volume 77 , March 2020, 108240
3	<i>Journal of Agricultural and Food Chemistry</i> 2015, 63, 46, 10161-10169 (Article), Publication Date (Web):October 27, 2015DOI: 10.1021/acs.jafc.5b03807
4	Phytochemical Stability in Dried Tomato Pulp and Peel As Affected by Moisture Properties Vera Lavelli*,William Kerr, and P. S. C. Sri Harsha <i>Journal of Agricultural and Food Chemistry</i> 2013, 61, 3, 700-707 Publication Date (Web):December 21, 2012DOI: 10.1021/jf303987v

Course Name	Food Quality Control	Programme Name	B.Voc. Food Science and Nutrition
Course Code	18BFSNC06	Academic Year Introduced	2018-2019
Type of Course	Theory	Semester	IV

COURSE OUTCOMES:

On completion of the course, the students will be able to											
C01	Identify different food safety hazards and its control methods										
C02	Describe and explain food quality concepts										
C03	Assess the quality of all the food items in the food group										
C04	Identify various food safety management tools used in food service operations										
C05	Summarize different national and international food regulations and standards										
Mapping of COs with POs, PSOs											
COs / Pos&PSOs	PO(T)	PO(E)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PO(A)	PSO 1	PSO 2	PSO 3
C01	3	2	3	3	3	3	3	3	3	3	3
C02	3	2	3	3	3	3	3	3	3	3	3
C03	3	2	3	3	3	3	3	3	3	3	3
C04	3	2	3	3	3	3	3	3	3	3	3
C05	3	2	3	3	3	3	3	3	3	3	3
1 – Slight, 2 – Moderate, 3 – Substantial											

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction L+Tu+Te=To
Introduction to Food Safety and Sanitation	To understand hazards and identify waste disposal methods	12
Introduction to Food Quality	To infer different assessment parameters	10
Food Quality Assessment	To demonstrate the quality estimation of foods	10
Food Quality Management	To frame SOPs and adopt GHP, GMP in industries	12
Food Laws and Legislations	To predict the role of food licensing agencies	10
Total Hours of Instruction		54

L-Lecture, Tu-Tutorial, Te-Tests, To-Total Hours

COURSE PLAN :

S. No.	Intended learning Outcomes	CO(s) Mapped	Cognitive Level/ KD	Psychomotor domain activity	Psychomotor domain level
Unit – I Introduction to Food Safety and Sanitation					
1.	Definition of food safety and hazards	C01	K1, F	Assess the food items for hazards and identify the removal method	K3, S2
2.	Types of hazards and its management	C01	K2, F		
3.	hygiene and sanitation in food industries – physical and chemical contaminants in food chain	C01	K2, C		

4.	Waste disposal methods	CO1	K2, C	Identify the waste disposal method followed in your college canteen	K4, S3
5.	Pest and rodent control	CO1	K2, C	Assess the effectiveness of pest management in your home/locality	K4, S4
6.	Personal hygiene practices	CO1	K2, C	List the hygiene practices followed in an industry	K1, S1
	Unit II Introduction to Food Quality				
7.	Definition of food quality, quality concepts, quality perception	CO2	K1, F	Group discussion about the importance of quality assurance personal in an industry	K2, S1
8.	Objectives of quality control and quality assurance	CO2	K1, F		
9.	Importance of quality control and quality assurance	CO2	K2, C		
10.	Functions of quality control and quality assurance	CO2	K2, F		
11.	Physical properties employed to assess food item's quality	CO2	K2, C	Performing quality estimation tests for food items while performing practical session	K2, S1
12.	Chemical properties employed to assess food item's quality	CO2	K2, C		
13.	Sensory properties employed to assess food item's quality	CO2	K3, C		
	UNIT – III Food Quality Assessment				
14.	Quality assessment of cereals and legumes	CO3	K4, P	Visit nearby industry and collect data regarding the quality assessment methods they follow and present it in the class	K5, S3
15.	Quality assessment of fruits and vegetables	CO3	K4, P		
16.	Quality assessment of dairy products	CO3	K4, P		
17.	Quality assessment of meat and poultry	CO3	K4, P		
18.	Quality assessment of egg and processed food items	CO3	K4, P		
19.	Definition of panel screening and selection of panel members	CO3	K1, C	Demonstrating different types of sensory evaluation methods in the class room	K3, S2
20.	Definition of sensory evaluation and its types	CO3	K3, P		
21.	Types of consumer survey and the factors influencing it	CO3	K1, F	Collect information show casing the importance of consumer survey	K2, S2
22.	Comparison of laboratory panels with consumer panels	CO3	K5, C		
23.	Limitations of consumer survey	CO3	K2, F		
	UNIT – IV Food Quality Management				
24.	Quality management systems in India	CO4	K1, C	Prepare a HACCP and GHP plan for a food product	K6, S4
25.	Food safety management tools – GHP, GMP	CO4	K2, C		

26.	Food safety management tools – HACCP	CO4	K2, C	which you have developed	
27.	International Organization for Standardization and Accreditation and auditing	CO4	K1, C	Identify the recent developments in food industrial sector and discuss on it	K2, S1
28.	Total Quality Management	CO4	K1, C		
29.	Recent development in food quality management systems	CO4	K2, C		
	UNIT – V Food Laws and Legislations				
30.	Indian food regulations, standards and certification – FSSAI	CO5	K2, C	Prepare a note on the benefits of food standards and certifications. Identify the licensing procedure	K2, S1
31.	BIS and Agmark	CO5	K2, C		
32.	Fruit Product Order and Meat Food Products Order	CO5	K2, C		
33.	Milk and Milk Product Order and Prevention of Food Adulteration Act	CO5	K2, C		
34.	International food regulations and certifications – ISO and FAO	CO5	K2, C	How far national standard is different from international standards. Identify it	K4, S2
35.	WTO and Codex Alimentarius Commission	CO5	K2, C		

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2	Srilakshmi B, Food Science, New Age International P Limited Publishers, New Delhi, 2018
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1	Philip. A.C. Reconceptualizing Quality. New Age International Publishers, Bangalore. 2001
2	Bhatia, R. AbdIchhpiyan, R.L. Quality assurance in microbiology. CBS publishers and Distributors, New Delhi. 2004.
3	Kher, C.P. Quality Control for the food Industry. ITC Publishers. Geneva. 2000
JOURNALS AND DOCUMENTS	
1	Journal of Food Quality, Wiley Publishers
2	Journal of Food Composition and Analysis, Elsevier
3	Food Quality and Preference, Elsevier
4	www.fao.org

Course Name	Food Product Development and Marketing – II	Programme Name	B.Voc. Food Science and Nutrition
Course Code	18BFSNA04	Academic Year Introduced	2018 - 19
Type of Course	Practical	Semester	IV

COURSE OUTCOMES

On completion of the course, the students will be able to												
CO1	Justify the role of raw materials and its uses											
CO2	Interpret the step involved Process line standardization of food product											
CO3	Analyze the product in different laboratory principles											
CO4	Choose the appropriate packaging material for developed food product											
CO5	Infer the procedure for getting license of the product											
Mapping of COs with POs, PSOs												
COs / POs & PSOs	PO(T)	PO(E)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PO(A)	PSO 1	PSO 2	PSO 3	PSO 4
CO1	1	3	2	3	3	3	3	3	3	3	3	3
CO2	1	3	2	3	3	3	3	3	3	3	3	3
CO3	1	3	2	3	3	3	3	3	3	3	3	3
CO4	1	3	2	3	3	3	3	3	3	3	3	3
CO5	1	3	2	3	3	3	3	3	3	3	3	3
1 – Slight, 2 – Moderate, 3 – Substantial												

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction Tu+P+Te=To
Raw material	To Justify the raw materials used for developed product	1+5+3 = 9
Process line standardisation	To exemplify the application of various process line standardization of developed food product	5+10+=18
Product quality control	To estimate the quality of the developed food product	5+10+3 = 18
Packaging and labelling	To find out the suitable packaging material for developed product	1+4+1 = 6
FSSAI licence	To steps in applying for FSSAI licensing	1+2+0 = 3
Total Hours of Instruction		54 (18x3)

Tu-Tutorial, P-Practical, Te-Tests, To-Total Hours

COURSE PLAN

Module/Experiment No.	Intended learning Chapters	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
Raw material					
1.	Justification for the raw materials used	CO1	K6,C	Identify the uses and role of the raw	K2, S1

				materials	
2.	CCP (critical control points) and GHP (good hygienic practices)	CO1	K4,F	Appraise the sanitary practices and controlled conditions for processing, handling of raw materials	K3,S3
Process line standardization					
3.	Analyse the CCP,GHP and GMP followed during product formulation	CO2	K4,P	Exemplify the health hazard, additives and sanitary practices for developed food product	K5,S3
Product quality control					
4.	Standard Operating Procedure for the developed product	CO3	K6,P	Infer the standard operating procedure for the developed product	K6,S4
Packaging and labelling					
5.	Types of packaging materials used	CO4	K3,C	Collect different types of packaging materials used in various products	K3,S1
6.	Parts of labelling	CO4	K3,C	Identify the parts of labelling involved in the various food products	K5,S1
7.	Creation of new label for the developed product	CO4	K6,C	Create a new label for the developed food product	K6,S4
FSSAI licence					
8.	FSSAI Licensing procedure	CO5	K1,C	Generate a model online process steps for applying FSSAI Licensing	K5,S1

REFERENCES

TEXTBOOKS	
2	Ranganna, S. (2004), Handbook of analysis and quality control for fruit and vegetable products Tata McGraw Hill publishing co.Ltd., New Delhi
3	<i>Richard Bonne et all (2005), A comprehensive hand-book to assess your hygiene practices and HACCP system, Guidelines on HACCP, GMP and GHP for ASEAN Food SMEs, Asia/2003/069-236.</i>
4	GMP And HACCP Handbook For Small And Medium Scale Food Processing Enterprises, published by the Ceylon Chamber of Commerce , Isbn: 978-955-604-037-1
JOURNALS	
1	Journal of Food Science and Technology, AFSTI publications.
2	International journal of Food science and technology, Edited by: Charles Brennan,Vol-55, ISSN:1365-2621
3	Journal of Food Quality, Published by Wiley, ISSN-0146-9428

Course Name	Food Processing and Preservation Practical II	Programme Name	B.Voc. Food Science and Nutrition
Course Code	18FSNC08	Academic Year Introduced	2018 - 19
Type of Course	Practical	Semester	IV

COURSE OUTCOMES

On completion of the course, the students will be able to											
C01:	Apply various drying and dehydration techniques for preserving fruits, vegetables, fleshy foods and milk.										
C02:	Prepare preserved foods using salt and sugar as a natural preservatives for extending the shelf life of perishable foods										
Mapping of COs with POs, PSOs											
COs / POs & PSOs	PO(T)	PO(E)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PO(A)	PSO1	PSO2	PSO3
C01	1	3	3	3	3	3	3	3	3	3	3
C02	1	3	3	3	3	3	3	3	3	3	3
1 – Slight, 2 – Moderate, 3 – Substantial											

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction Tu+P+Te=To
Module I Preservation Using Drying, dehydration and concentration Techniques	To preserve the perishable foods like fruits, vegetables, fleshy foods and milk using drying and dehydration techniques	6+6+6=18
Module II Preservation Using Salt	To apply salt as a natural preservative for extending the shelf life of perishable foods	6+6+6=18
Module III Preservation using Sugar	To apply sugar as a natural preservative for extending the shelf life of perishable foods	6+6+6=18
Total Hours of Instruction		54

Tu-Tutorial, P-Practical, Te-Tests, To-Total Hours

COURSE PLAN

Module/E xperiment No.	Intended learning Chapters	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
Module I Preservation Using Drying Techniques					
1.	Osmotic dehydrated fruit – preserve	C01	K3 P	Demonstrate the different drying techniques	K5 S2
2.	Preparation of dried and dehydrated vegetables	C01	K3 P	Perform organoleptic evaluation for prepared products	K5 S3

				using hedonic scale	
3.	Preparation of salted and dried meat and dried fish	CO1	K3 P	Evaluate the shelf life of dried fleshy foods	K4 S1
4.	Preparation of cream, butter and ghee and paneer	CO1	K3 P	Use the prepared milk products for the preparation of other recipes	K1 S1
Module II Preservation Using Salt					
5.	Preparation of pickle using Vegetables (Lemon, Mango, Mixed Vegetables, Tomato, Greens, etc)	CO2	K3 P	Perform organoleptic evaluation for prepared products using hedonic scale	K4 S2
6.	Preparation of pickle from prawn, fish and meat	CO2	K3 P		
Module III Preservation using Sugar					
7.	Preparation of Fruit Jam (Apple, Pineapple, Grape, Mixed Fruits, etc)	CO2	K3 P	Perform organoleptic evaluation for prepared products using hedonic scale	K4 S2
8.	Preparation of Squash and fruit juice concentrate	CO2	K3 P	Examine the parameters of Squash and Fruit Juice concentrate, Sauce, Ketchup as per FSSAI Standards	K4 S2
9.	Preparation of sauce and ketchup	CO2	K3 P		
10.	Preparation of ice-cream and custard	CO2	K3 P	Perform organoleptic evaluation for prepared products using hedonic scale	K4 S2

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1	Srilakshmi, B. (2018), Food Science, 7th edition, New Age International (P) Ltd, Punishers, New Delhi.
2	Subbhulakshmi G and Shobha A. Udipi. (2017) Food Processing and Preservation. New Age International (P) Ltd, Punishers, New Delhi.

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1	Norman W. Desroseier and James N. Desroseier. (2004). The technology of Food Preservation. Fourth Edition. CBS Publishers and Distributors.
2	Getachew Osei. Processing and Preservation of Dairy Products. (2010). Agri Horti Press.

JOURNALS AND DOCUMENTS

1	Journal of Food Science and Technology
2	Journal of Fruit Processing and Preservation

Course Name	Food for Life	Programme Name	B.Voc Food Science and Nutrition
Course Code	18FSTNEL04	Academic Year Introduced	2018-2019
Type of Course	Theory	Semester	IV

COURSE OUTCOMES

On completion of the course, the students will be able to											
CO1	To implement the concept of food pyramid, balanced diet in planning a menu										
CO2	To recommend the dietary guidelines for Indians										
CO3	To analyse and evaluate the factors affecting currents trend,food purchase and consumption pattern										
CO4	To develop innovative ideas to assure food equity in all the situations										
CO5	To analyse the factors affecting dietary habits and requirements different stages of life cycle										
Mapping of COs with POs, PSOs											
COs / POs & PSOs	PO(T)	PO(E)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PO(A)	PSO1	PSO2	PSO3
CO1	3	2	3	3	3	3	3	3	3	3	3
CO2	3	2	3	3	3	3	3	3	3	3	3
CO3	3	2	3	3	3	3	3	3	3	3	3
CO4	3	2	3	3	3	3	3	3	3	3	3
CO5	3	2	3	3	3	3	3	3	3	3	3
1 – Slight, 2 – Moderate, 3 – Substantial											

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction L+Tu+Te=To
Principles of meal planning	To highlight the principles of menu planning	12
Dietary Guidelines for Indians	To exhibit the current view on dietary guidelines for Indians	10
Food preparation, selection and consumption	To discuss the Food preparation, selection, consumption trend	10
Food Equity	To review the Food equity and factors influencing it	12
Diet in different stages of life cycle	To understand the Nutritional requirements in different stages of life cycle	10
Total Hours of Instruction		54

L-Lecture, Tu-Tutorial, Te-Tests, To-Total Hours

COURSE PLAN

Unit/Chapters	Intended learning Outcomes	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
UNIT I Principles of meal planning					
1.	Food groups and Food exchange list	CO1	K1C	Do a model of food pyramid/my plate and present it (Group activity)	K2S2
2.	Factors affecting meal planning and food related behaviour	CO1	K2C		
3.	Methods of assessment of nutrient requirements	CO1	K3P		

4.	Steps in planning balanced diet	C01	K3P	Identify the steps in diet planning followed by a dietitian	K3S1
UNIT II: Dietary Guidelines for Indians					
5.	Current diet and nutrition scenario	C02	K2C	Find out the merits and demerits of various trending diets	K5S2
6.	Dietary goals and 15 dietary guidelines for Indians	C02	K2F		
7.	Energy cost for exercise and physical activity	C02	K2C	Estimate a days energy cost for the specified age groups.	
8.	Menu planning considerations for special occasions	C02	K3P	Do a presentation on each type of catering services and types of hotel	K2S3
9.	☐ Menu planning considerations in catering and service operations	C02	K3P		
UNIT III: Food preparation, selection and consumption					
10.	Food preparation – preparation of food, methods of cooking, medium of cooking and changes during cooking	C03	K3P	Take one method of cooking and explain about nutritional changes during cooking	K2S2
11.	Criteria for selection and purchase of nutritious food	C03	K3P	Choose one food item and formulate a selection criteria for the food item	
12.	Role of nutritional labelling in selection and purchase of food	C03	K2C	A packed product with nutritional claim and highlight the ingredient responsible for the claim	
13.	Transition in food consumption pattern	C03	K2C	Prepare a questionnaire regarding food consumption pattern	K6S4
14.	Factors affecting food consumption pattern – social, economic, nutritional and environmental	C03	K2C	Collect different types of cuisines and foods across the world (South indian/Punjabi/me diterranen/an/orien tal/continental/we stern/Italian/Frenc h) in the form of chart /ppt/scrap book	K2S2
15.	Past and present food trends	C03	K4C		
UNIT IV: Food equity					
16.	Definition of food equity and inequity Circumstances that relate to food inequities -access to a continuous and safe supply of water, availability of safe and nutritious food, financial means to meet food needs, knowledge of nutrition principles to enable appropriate selection of food, distribution issues	C04	K2C	Collect a report on emergency situations all over the world and nutritional problems occurred during such situations	K1S2

17.	Influences on food availability and distribution towards food equity - geography/climate, religious/cultural beliefs, socioeconomic status, government policy such as trade restrictions, natural disasters such as flooding or drought, war, educational levels, multinationals, technological developments such as transport and refrigeration	CO4	K2C	Prepare a write up on 1 Programmes and policies carried out by Governmental and Non Governmental agency towards food equity and supply of safewater and food during emergencies	K2S3
18.	Access to food by different groups of people – rural and isolated people, people on low incomes or unemployed, women and children, people with disabilities, the aged/elderly, Aboriginal and indigenous people, chronically ill people, people with dementia, alcohol and drug abusers, homeless people	CO4	K2C	Prepare a poster or pamphlet for access to food by different types of people	K3S5
19.	Food production practices – cash cropping and subsistence farming	CO4	K2C		
20.	Government and voluntary support networks for food equity	CO4	K1C		
UNIT V: Diet in different stages of life cycle					
21.	RDA, nutritional requirements and balanced diet planning for pregnancy, lactation, infancy, childhood, adolescence, adulthood and aged	CO5	K3C	Enlist the problem occurring during each stage of lifecycle and devise a nutritional management plan for each problem	K6S4
22.	Factors influencing food habits in different stages of life	CO5	K2C		

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1	Sri Lakshmi, B. (2018), Food Science, New Age International [P] Limited, New Delhi, Seventh Edition
2	Sri Lakshmi, B. (2018), Nutrition Science, New Age International [P] Limited, New Delhi, Sixth Edition
3	Shakuntalamanay, N. & Shadakcheraswamy, M, (2004), Foods, Facts and Principles, Wiley Eastern Ltd.
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1	Ahmed, M.N. (2005), Food Science and Nutrition, 1 st Edition, Anmol Publications Pvt. Ltd, New Delhi.
2	Swaminathan, M. Advanced text book on Food and Nutrition, , An mol Publication Pvt, Ltd, Second Edition. 2004.
3	Sunetra Roday (2012), Food Science and Nutrition, Second Edition, Oxford University Press, India.
4	Joshi, S. A. (1995). Nutrition and dietetics. McGraw-Hill Education.
5	Escott-Stump, S., & Mahan, L. K. (Eds.). (2000). Krause's food, nutrition, & diet therapy. WB Saunders.
6	Bamji, M.S., Krishnaswamy, K., & Brahman, G. N. V. (Eds.). (2016). Textbook of human nutrition. Oxford & IBH.

JOURNALS AND DOCUMENTS

1	American Journal of Clinical Nutrition, American Society for Nutrition, 29165
2	Journal of Human Nutrition and Dietetics, Blackwell Publishing Inc.
3	Journal of Nutrition, Health and Ageing, Springer Paris
4	Advances in Nutrition, American Society of Nutrition

Course Name	Instrumentation and Process Control	Programme Name	B.Voc. Food Science and Nutrition
Course Code	18BFSNC07	Academic Year	2018 - 2019
Type of Course	Theory	Semester	IV

COURSE OUTCOMES:

On completion of the course, the students will be able to												
CO1	understand the concept of unit operations of food processing, transport and storage equipments											
CO2	spelt the principle and applications of processing and separation equipments in food industry											
CO3	distinguish the principle and applications of the various heat transfer equipments used in food operation											
CO4	comprehend the technical operation of the food processing equipments used in mass transfer process											
CO5	twig the application of high end novel food processing and packaging equipments with quality assurance											
Mapping of COs with POs, PSOs												
COs / Pos&PS Os	PO(T)	PO(E)	PO(P 1)	PO(P 2)	PO(P 3)	PO(P 4)	PO(P 5)	PO(A)	PSO 1	PSO 2	PSO 3	PSO 4
CO1	3	1	3	2	2	1	1	1	2	1	1	2
CO2	3	1	3	2	2	1	1	2	3	2	2	2
CO3	3	1	3	2	2	1	1	2	3	2	2	2
CO4	3	1	3	2	2	1	1	2	3	2	2	2
CO5	3	1	3	3	3	2	1	2	3	2	2	3
1 – Slight, 2 – Moderate, 3 – Substantial												

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module Title	Objectives	Hours of Instruction L+Tu+Te=To
Unit Operations, Transport and Storage Equipments	To learn the food processing operations, transport and storage of perishable, non-perishable and semi perishable foods	12
Processing and Separation Equipments	To understand the role of processing and separation equipments in a food business operation	10
Heat Transfer Equipments	To study the different type of heat transfer equipments and its functions	10
Mass Transfer Equipments	To learn the importance and operating procedure of the mass transfer equipments	12
Equipments for Novel Food Processes and Packaging	To familiarize the role of novel equipments in advanced food processing and packaging technology	10
Total Hours of Instruction		54

L-Lecture, Tu-Tutorial, Te-Tests, To-Total Hours

COURSE PLAN:

Unit/Chapters	Intended Learning Chapters	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activities	Psychomotor domain level
UNIT I: Unit Operations, Transport and Storage Equipments					

1	Classifications; design and selection of food processing equipments	CO1	K2, C	Enlist the equipments used in various units of processing of any one food product	K2, S1
2	Mechanical transport equipments - pumps, process piping and valves, conveyors	CO1	K2, C	Solicit the equipments used to transport products in continuous operation of a food processing unit	K3, S1
3	Food storage equipments – solid and liquid food storage equipments	CO1	K2, C	Prepare a video presentation on food storage equipments in any one food operation	K6, S1
UNIT II: Processing and Separation Equipments					
4	Processing equipments - peelers, dehullers / dehuskers, size reduction-slicers/ dicers, mincers, cutters, crushers and grinders; size enlargement-agglomerators, homogenizers and mixers	CO1	K2, C	Develop a e-content on principle, application and ISI technical specifications of any one food processing equipment	K3, S1
5	Separation equipments – sorters, separators – solid /solid separators, solid / liquid separators.	CO1	K2, C	Conduct a systematic literature review on various models of separation equipments used in any one food processing operation	K5, S4
UNIT III: Heat Transfer Equipments					
6	Heat transfer equipments – heat exchangers	CO2	K2, C	Prepare and display the SOP for the operation of any one heat transfer equipments	K3, S2
7	Heat generation equipments- microwave oven, omhic heating system, infrared emitters	CO2	K2, C		
8	Food evaporation equipments- evaporators	CO2	K2, C		
9	Thermal processing equipments – blanchers, sterilizers and pasteurizers	CO2	K2, C		
Unit-IV Mass Transfer Equipments					
10	Distillers, extraction and leaching equipments, gas and liquid absorption equipments, adsorption and ion exchange	CO3	K2, C	Define the role of any one mass transfer equipments in various food operations through interactive video presentation	K5, S1

	equipments, crystallizers				
11	Food dehydration equipment- dryers	C03	K2, C		
12	Refrigeration and freezing equipments – refrigerators, freezers, thawers, freeze driers or lyophilizers	C03	K2, C		
Unit-V Equipments for Novel Food Processes and Packaging					
13	Membrane separation equipment, irradiation system, extruders, fermenters	C04	K2, C	Select an equipment and describe the manufacturing protocol to prepare any one value added product	K5, S4
14	Pulse electric field processing equipment, high pressure processing equipment, pulsed light processing equipment	C04	K2, C	Find the feasible application of any one novel processing equipment in a medium scale industry	K5, S1
15	Instrumentation and control for food quality assurance	C04	K2, C	Design a process flow for a quality assurance in a food production unit	K6, S3
16	Fillers, closures, sealers, wrappers, aseptic packaging equipment and palletizers	C05	K2, C	Exhibit the upgradation to be made in a food packaging equipment according to the packaging material	K6, S5

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2.	Peter Zeuthen and LeifBogh – Sorensen, (2003), Food Preservation Techniques, Woodhead publishing ltd.
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JOURNALS AND DOCUMENTS	
1.	Food Control, Elsevier
2.	Critical Reviews in Food Science and Nutrition, Taylor & Francis

Course Name	Food Microbiology	Programme Name	B.Voc. Food Science and Nutrition
Course Code	18BFSNC09	Academic Year Introduced	2018 – 19
Type of Course	Theory	Semester	V

COURSE OUTCOMES

On completion of the course, the students will be able to											
CO1	Recognize microbial characteristics and demonstrate isolation techniques										
CO2	Analyze the type of food spoilage & intoxication and describe the source of contamination										
CO3	Appraise the benefits of fermentation and its products										
CO4	Interpret the destruction methods employed and its effectiveness										
CO5	Inspect food items for securing its quality										
Mapping of COs with POs, PSOs											
COs / POs & PSOs	PO(T)	PO(E)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PO(A)	PSO1	PSO2	PSO3
CO1	3	3	2	3	2	3	2	3	3	3	3
CO2	3	3	2	3	2	3	2	3	3	3	3
CO3	3	3	2	3	2	3	2	3	3	3	3
CO4	3	3	2	3	2	3	2	3	3	3	3
CO5	3	3	2	3	2	3	2	3	3	3	3
1 – Slight, 2 – Moderate, 3 – Substantial											

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction L+Tu+Te=To
Unit I - Introduction and scope of food microbiology	To gain knowledge about food microbiology	12
Unit II - Spoilage, microbiology of food and food borne diseases	To understand the causes of food spoilage, contamination and food borne diseases	10
Unit III - Food fermentation	To familiarize with the techniques of food fermentation and its uses	10
Unit IV - Control and destruction of microorganisms	To employ best disinfectant methods and identify best disinfecting agents	12
Unit V - Indices of sanitary quality	To recognize the microbial limits of food, water and soil	10
Total Hours of Instruction		54

L-Lecture, Tu-Tutorial, Te-Tests, To-Total Hours

COURSE PLAN

Unit/Chapter	Intended learning Outcomes	CO(s) Mapped	Cognitive Level/ KD	Psychomotor domain activity	Psychomotor domain level
Unit I: INTRODUCTION AND SCOPE OF FOOD MICROBIOLOGY					
1.	Brief history of food microbiology	CO1	K2 F	Collect information on the recent developments in food microbiology	K6 S1
2.	Introduction to important microorganisms in food	CO1	K2 F		
3.	General characteristics of bacteria, fungi, virus, protozoa and algae	CO1	K1 C	Prepare a chart work depicting the characteristics of	K6 S2

				microorganisms	
4.	Cultivation of microorganisms –Nutritional requirements, types of media used and method of isolation	C01	K1 C	Perform microbial isolation techniques in the laboratory	K3 S3
UNIT II: SPOILAGE, MICROBIOLOGY OF FOOD AND FOOD BORNE DISEASES					
5.	Types – food borne infections and Intoxications	C02	K1 C	Trace the reported incidents on food borne diseases	K4 S1
6.	Water activity and food spoilage	C02	K1 C	Draw a curve showing the water activity level of different foods (from minimum to maximum range)	K3 S2
7.	Food spoilage – types and sources	C02	K1 C		
8.	Contamination of cereals and cereal products	C02	K2 F	Recognize the sources of contamination and discuss on it	K2 S1
9.	Contamination of vegetables and fruits	C02	K2 F	Frame a SOP for proper storing of fruits and vegetables to prevent contamination	K6 S4
10.	Contamination of meat and meat products	C02	K2 F	Collect pictures for the do's and don'ts to be followed in handling of fleshy foods	K2 S3
11.	Contamination of fish, egg and poultry	C02	K2 F		
12.	Contamination of milk and milk products	C02	K2 F	Interpret the sources of contamination	K3 S1
13.	Contamination of sugar and sugar products	C02	K2 F	Develop a scrap book or chart work with pictures showing the contamination of sugar and its products	K6 S2
14.	Contamination of canned foods	C02	K2 F	Visit a store or super market and assess the canned products for contamination based on its physical appearance	K5 S3
UNIT III: FOOD FERMENTATION					
15.	Fermentation - definition and types; Microorganisms used in food fermentations	C03	K2 C	Inspect the benefits of micro organisms used in fermentation techniques	K3 S1
16.	Dairy fermentation - starter cultures and their types, concept of probiotics	C03	K2 C	Distinguish probiotics and prebiotics with appropriate examples	K4 S2
17.	Fermented foods -types, methods of manufacture for vinegar, sauerkraut, tempeh, miso, soya sauce ,beer, wine and traditional Indian foods	C03	K3 P	Collect pictures of fermented foods listed and circulate it with its way of usage	K6 S3

UNIT IV: CONTROL AND DESTRUCTION OF MICROORGANISMS					
18.	Fundamentals of control of microorganisms in food – Extrinsic and intrinsic factors affecting growth and survival of microorganisms	CO4	K2 C	Draw growth curve of micro organism and display it in your class room	K4 S1
19.	Use of high and low temperature, dehydration, freezing, freeze drying, irradiation and preservatives in food	CO4	K2 C	Assess the market and find out the products that are preserved using the given preservation techniques	K5 S3
20.	Sterilisation and disinfection – methods	CO4	K2 C	Collect videos on disinfection methods used worldwide in eliminating micro organisms or its growth	K6 S2
21.	Common disinfectants used in home and at industries	CO4	K3 P		
22.	Tests to identify the effectiveness of sterilization and disinfection.	CO4	K4 P		
UNIT V: INDICES OF SANITARY QUALITY					
23.	Indices of food, milk and water sanitary quality	CO5	K1 F	Identify the permissible organisms and its limit in food, milk and water	K4 S1
24.	Microbiological criteria of foods, water and milk testing	CO5	K4 P		
25.	Sampling of air, water, dust, soil, food and food handlers to study the various sources of transmission of microorganism in food	CO5	K4 P	Analyze the GHP and GMP procedures to be followed in preventing the transmission of microbes from one source to another	K4 S3

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2	Adams MR, Moss MO (2007), Food Microbiology, Royal Society of Chemistry, 3 rd Edition
3	Matthews KR, Kniel KE, Montville TJ (2017), Food Microbiology; An Introduction, ASM Press, 4 th Edition
REFERENCE BOOKS	
1	Doyle MP, Buchanan RL, (2012), Food Microbiology; Fundamentals and Frontiers, ASM Press, 4 th Edition
2	Hal King, (2013) Food Safety management: Implementing a Food Safety Program in a Food Retail Business, Springer
3	Forsythe SJ, (2011) The Microbiology of Safe Food, Wiley Blackwell Publications, 2 nd Edition
JOURNALS AND DOCUMENTS	
1	International Journal of Food Microbiology, Elsevier
2	Journal of Food: Microbiology, Safety and Hygiene
2	Journal of Food Processing and Technology

Course Name	Food Packaging Technology	Programme Name	B.Voc Food Science and Nutrition
Course Code	15BFSNC10	Academic Year Introduced	2018 - 2019
Type of Course	Theory	Semester	V

COURSE OUTCOMES

On completion of the course, the students will be able to											
CO1	Recall the history, packaging functions and requirements										
CO2	Distinguish various types of packaging materials and other accessories in packaging										
CO3	Apply the acquired knowledge in advanced packaging systems										
CO4	Select and develop appropriate specific packaging material for specific food products										
CO5	Test the effective and worthiness of packaging materials through various standard tests										
CO6	Assess and evaluate the quality of packaged food										
CO7	Study and interpolate the packaging rules and regulations										
Mapping of COs with POs, PSOs											
COs / POs & PSOs	PO(T)	PO(E)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PO(A)	PSO1	PSO2	PSO3
CO1	3	3	2	3	2	3	2	3	3	3	3
CO2	3	3	2	3	2	3	2	3	3	3	3
CO3	3	3	2	3	2	3	2	3	3	3	3
CO4	3	3	2	3	2	3	2	3	3	3	3
CO5	3	3	2	3	2	3	2	3	3	3	3
1 – Slight, 2 – Moderate, 3 – Substantial											

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction L+Tu+Te=To
Introduction and scope of food packaging	To understand the basic functions of a food package, Food package design and development	5
Packaging materials	To familiarize with different types of packaging materials and its applications	5
Packaging systems and methods for food products	To impart knowledge on recent trends in Food Packaging system	10
Food packaging design	To learn the concepts in the designing of packaging materials for various food products	8
Testing and evaluation of packaging material	To gain knowledge about the testing and standards of packaging materials	10
Testing and evaluation of packaged foods	To learn about testing and standards of packaged foods	8
Packaging laws and regulations	To familiarize with the recent packaging laws and regulations	8
Total Hours of Instruction		54

L-Lecture, Tu-Tutorial, Te-Tests, To-Total Hours

COURSE PLAN

Unit/ Chapters	Intended learning Outcomes	CO(s) Mapped	Cognitive Level /KD	Psychomotor domain activity	Psychomotor domain level
UNIT I: Introduction and scope of food packaging					
1.	Definition, importance and role of food	CO1	K1,F	Visit a food packaging and label	K2,S2

	packaging			manufacturing industry and prepare a report	
2.	Principles in the development of safe and protective packing	C01	K1,C		
3.	Factors determining the packaging requirements of various foods	C01	K2,C		
4.	Classification of packaging	C01	K2,C		
UNIT II: Packaging materials: Properties and application of primary packaging materials					
5.	Paperboards, metals, plastics, wood, plywood, glass, flexible packaging materials	C02	K1,C	Collect different types of packages and containers(paper,plastic,metal,glass) and discuss its advantages and disadvantages in front of your classmates	K4,S3
6.	Labels, caps and closures and wads, adhesives, inks and lacquers, cushioning materials, reinforcements etc.	C02	K1,C	Collect different types of closures,wads,cushioning materials adhesives,inks and lacquers discuss its advantages and disadvantages in front of your classmates	K4,S3
UNIT III: Packaging systems and methods for food products					
7.	Vacuum packaging, gas flush packaging, CAP & MAP, aseptic and retort packaging, Bag-in-Box packaging, artificial and intelligent packaging	C03	K2,P	Write an assignment on recent packaging systems and other advanced technologies used.	K2,S2
UNIT IV: Food packaging design					
8.	Package design for fresh horticultural produce and animal foods, dry and moisture sensitive foods, frozen foods, fats and oils, thermally processed foods and beverages.	C04	K5,C	Choose a particular food materials, enlist the requirements for effective packaging and suggest all the packaging materials that can be used	K2,S3
9.	Food marketing and role of packaging	C04	K2,C	Design a suitable package with label for the given food product	
UNIT V: Testing and evaluation of packaging material					
10.	Thickness, tensile strength, puncture resistance, bursting strength, seal strength, water vapor permeability, CO2 permeability, oxygen permeability, grease resistance	C05	K4,P	Bring a video related to any of the testing procedures of any packaging material and present it	K2,S2
UNIT VI: Testing and evaluation of packaged foods					
11.	Compatibility and shelf life studies, evaluation of transport worthiness of filled packages	C06	K4,P	Select a packaged food product(one brand) and identify their advanced technologies adapted to increase the shelf life of the package	K2,S3

				(compare the shelf life)	
UNIT VII: Packaging laws and regulations					
12.	FDA, PFA, Packaging Commodity Rules, Weight and Measures Act, Packaging and Labelling Rules and Regulations of FSSAI	C07	K2,F	Bring one news article regarding issues faced by the food business companies violating the packaging laws and regulations, discuss it with your classmates	K2,S3
13.	Coding and marking including barcoding	C07	K2,C	List out the different types of codings used in food packages	K2,S2
14.	Environmental & Eco issues and waste disposal	C07	K2,C	Choose one material and its implication on environment and come up with ideas for safe disposal or reuse	K3,S3

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2	Paine F.A and Paine H.Y,(1992) A Handbook of Food Packaging, Blackie Academic and Professional, New York.
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2	Kit L.Y and Dong S.L, Emerging Food Packaging Technologies – Principles and Practices, Woodhead Publishers, USA, 2012.
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JOURNALS AND DOCUMENTS	
1	Journal of Food Science and Technology, AFSTI Publication
2	Annals. Food Science and Technology, Valahia University Press
3	Food Science and Human Wellness, Beijing Academy of Food Sciences
4	Journal of Food, Agriculture and Environment, WFL Publisher Ltd.
5	Natural Products and Bioprospecting, Springer

Course Name	Food Microbiology	Programme Name	B.Voc.Food Science and Nutrition
Course Code	18BFSNC09	Academic Year Introduced	2018-2019
Type of Course	Practical	Semester	V

COURSE OUTCOMES

On completion of the course, the students will be able to											
CO1	Handle the equipments in a microbiology lab.										
CO2	Prepare the laboratory media and special media, cultivation of bacteria, yeasts and moulds.										
CO3	Staining the bacteria: gram-staining.										
CO4	Cultivate and identify the important molds and yeast in food items.										
CO5	Demonstration of available rapid methods and diagnostic kits used in identification of microorganisms or their products.										
Mapping of COs with POs, PSOs											
COs / POs & PSOs	PO(T)	PO(E)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PO(A)	PSO1	PSO2	PSO3
CO1	1	3	2	3	2	3	2	3	3	3	3
CO2	1	3	2	3	2	3	2	3	3	3	3
CO3	1	3	2	3	2	3	2	3	3	3	3
CO4	1	3	2	3	2	3	2	3	3	3	3
CO5	1	3	2	3	2	3	2	3	3	3	3
1 – Slight, 2 – Moderate, 3 – Substantial											

RUBRICS FOR PRACTICAL:

Assessment Rubrics / Scaling Percentage	Outstanding (81 - 100%)	Good (66 - 80%)	Satisfactory (50 - 65 %)
Conduct of Experiment (20)	Meticulous hands on skill in conducting experiments with clear understanding of principle and procedure	Able to conduct the experiment based on the given procedure	Lack of hands on skill and clarity in conducting experiments
Observation (20)	Excellent interpretation of the objectives and able to obtain accurate results	Good interpretation of the objectives and able to obtain result in tolerance range	Fair in interpreting the objectives and able to obtain result below tolerance range
Record (20)	Exceptional maintenance of records by following appropriate formats and adhering to deadline	Fair maintenance of records by following appropriate formats and submitting slightly beyond deadline	Lack of fair maintenance of record and delayed submission beyond deadline
Viva-voce (15)	Excellent in preparedness, clear delivery and knowledge in application	Good in preparedness, delivery and knowledge in application	Fair in preparedness, delivery and inadequate knowledge in application

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction L+Tu+Te=To
1. Standard operating procedure for microbial laboratory	Handle the equipments in a microbiology lab.	3
2. Examine the morphology of microorganisms present in the given food samples by simple positive staining	Staining the bacteria: gram-staining.	3

technique		
3. Examine the morphology of microorganisms present in the given food samples by simple negative staining technique		3
4. Examine the morphology of microorganisms present in the given food samples by gram's staining technique		3
5. Preparation of culture media for the growth of microorganisms		4
6. Techniques for isolation of microorganisms using serial dilution method		4
7. Enumerate the microbial load of given food sample by spread plate method		4
8. Enumerate the microbial load of given food sample by pour plate method		4
9. Enumerate the microbial load of given food sample by streak plate method		4
10. Biochemical characteristics of microorganisms - indole production test		4
11. Methyl red test		4
12. Voges – proskauer test		3
13. Citrate utilization test		4
14. Enumerate the microbial load of food processing equipment's and vessels		4
15. Assessing the load of indicator microorganisms present in the given food sample		3
Total Hours of Instruction		54

L-Lecture, Tu-Tutorial, Te-Tests, To-Total Hours

COURSE PLAN

Unit/Chapters	Intended learning Outcomes	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
1.	Standard operating procedure for microbial laboratory	CO1	K1, K2, K3 P	Power point Presentation and Practical Explanation in Laboratory	S1, S3
2.	Examine the morphology of microorganisms present in the given food samples by simple positive staining technique	CO3	K1, K2, K3, K5 P	Demonstration and Individual Practical practice in the Laboratory and Record work	S1, S3
3.	Examine the morphology of microorganisms present in the given food samples by simple negative staining technique		K1, K2, K3, K5 P	Demonstration and Individual Practical practice in the Laboratory and Record work	S1, S3
4.	Examine the morphology of microorganisms present in the given food samples by gram's		K1, K2, K3, K5 P	Demonstration and Individual Practical practice in the Laboratory and	S1, S3

	staining technique			Record work	
5.	Preparation of culture media for the growth of microorganisms	CO2	K1, K2, K3, K5 P	Demonstration and Individual Practical practice in the Laboratory and Record work	S1, S3
6.	Techniques for isolation of microorganisms using serial dilution method		K1, K2, K3, K5 P	Demonstration and Individual Practical practice in the Laboratory and Record work	S1, S3
7.	Enumerate the microbial load of given food sample by spread plate method		K1, K2, K3, K5 P	Demonstration and Individual Practical practice in the Laboratory and Record work	S1, S3
8.	Enumerate the microbial load of given food sample by pour plate method		K1, K2, K3, K5 P	Demonstration and Individual Practical practice in the Laboratory and Record work	S1, S3
9.	Enumerate the microbial load of given food sample by streak plate method		K1, K2, K3, K5 P	Demonstration and Individual Practical practice in the Laboratory and Record work	S1, S3
10.	Biochemical characteristics of microorganisms - indole production test	CO4, CO5	K1, K2, K3, K5 P	Demonstration and Individual Practical practice in the Laboratory and Record work	S1, S3
11.	Methyl red test		K1, K2, K3, K5 P	Demonstration and Individual Practical practice in the Laboratory and Record work	S1, S3
12.	Voges – proskauer test		K1, K2, K3, K5 P	Demonstration and Individual Practical practice in the Laboratory and Record work	S1, S3
13.	Citrate utilization test		K1, K2, K3, K5 P	Demonstration and Individual Practical practice in the Laboratory and Record work	S1, S3
14.	Enumerate the microbial load of food processing equipment's and vessels		K1, K2, K3, K5 P	Demonstration and Individual Practical practice in the Laboratory and Record work	S1, S3
15.	Assessing the load of indicator microorganisms present in the given food sample		K1, K2, K3, K5 P	Demonstration and Individual Practical practice in the Laboratory and Record work	S1, S3

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2	Food Microbiology, 5th Edition, Frazier, Westhoff, Vanitha N M, 2014
3	Laboratory Methods in Food Microbiology , , 3rd Edition, Harrigan F.W,2013
4	Fundamentals Food Microbiology, 4e, Ray, 2011
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1	Prescott M (2005) Microbiology. 6th Edition, Tata McGraw – Hill, New Delhi
2	Albert G Moat & John W Foster (2004). Microbial Physiology. 4th Edition, John Wiley & Sons, New York.
3	Edward Alcamo (2001). Fundamentals of Microbiology. 6th Edition, Jones & Bartlett Publishers, New York.
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Course Name	Food Quality Analysis Practical	Programme Name	B.Voc. Food Science and Nutrition
Course Code	18BFSNC12	Academic Year Introduced	2018 - 19
Type of Course	Practical	Semester	V

COURSE OUTCOMES

On completion of the course, the students will be able to											
CO1	Execute the steps in Standard operating procedures for food analysis laboratory										
CO2	Analyze the chemical properties and microscopic examination of starch in cereals, millets and pulses										
CO3	appraise the degree of acidity indicators reflect the quality of foods										
CO4	Analyze the protein content of fleshy foods which can be determined by different method										
CO5	Interpret the density, organic solid content and fat present in the nuts and oil seeds										
CO6	Categorize the various components present in the milk and milk products										
CO7	Categorize the common milk adulterants as well as different method to detect the adulterants										
CO8	Detect the presents of non -permitted food colours in spices, Condiments Sugar and Jaggery										
Mapping of COs with POs, PSOs											
COs / POs & PSOs	PO(T)	PO(E)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PO(A)	PSO1	PSO2	PSO3
CO1	1	3	2	3	2	3	2	3	3	3	3
CO2	1	3	2	3	2	3	2	3	3	3	3
CO3	1	3	2	3	2	3	2	3	3	3	3
CO4	1	3	2	3	2	3	2	3	3	3	3
1 – Slight, 2 – Moderate, 3 – Substantial											

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction Tu+P+Te=To
General	To interpreted the Standard operating procedures for food analysis laboratory	1+5+3 = 9
Cereals, Pseudo cereals, Millets and Pulses	To determine the chemical properties and visualize the structure of different starches present in the different food products	3+5+2=10
Fruits and Vegetables	To determined by neutralizing the acid present in a known quantity of food sample	3+5+2 = 10
Fleshy Foods and Egg	To enable the students to determine the protein content of fleshy foods which can be determined by different method	1+4+1 = 6
Fats & Oils, Nuts and Oilseeds	To determined the density of the oil, organic solid content and fat present in the nuts and oil seeds	1+2+0 = 3
Milk and Milk Products	To enable the students to interpret the common milk adulterants as well as different method to detect the adulterants both quantitatively and qualitatively	2+5+2=9
Spices and Condiments Sugar and Jaggery	To enable the students to categorize the non -permitted food colours and other adulterant present in spices, Condiments Sugar and Jaggery	2+4+1=7
Total Hours of Instruction		54 (18x3)

Tu-Tutorial, P-Practical, Te-Tests, To-Total Hours

COURSE PLAN

Module No.	Intended learning Chapters	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
General					
1.	Standard operating procedures for food analysis laboratory	CO1	K6,P	Create flow diagram of the standard operative procedure in food analysis laboratory	K6, S3
Cereals, Pseudo cereals, Millets and Pulses					
2.	Determination of moisture content	CO2	K4,P	Appraise the average percent of water content present in the food sample	K4, S1
3.	Determination of total ash content	CO2	K4,P	Determine the dry ash and wet ash content present in the sample	K4, S1
4.	Determination of acid insoluble ash content	CO2	K4,P	Estimate the purity and quality of the acid insoluble ash content	K4, S1
5.	Determination of crude fibre	CO2	K4,P	Compare sample value to current literature	K3, S1
4.	Examine the microscopic structure of different starches	CO2	K4,P	Differentiate microscopic structure of different starches	K3, S1
Fruits and Vegetables					
5.	Determination of titrable acidity	CO3	K4,P	Construct the total acid content present in various fruits and vegetables	K4, S1
Fleshy Foods and Egg					
6.	Determination of protein	CO4	K4,P	Assess and demonstrate the nitrogen content of the fleshy foods and egg while adopt the different method	K5, S1
Fats & Oils, Nuts and Oilseeds					
7.	Determination of specific gravity and refractive index	CO5	K4,P	Exemplify the specific gravity and refractive index in fats ,oils nuts and seeds	K4, S2
8.	Determination of melting point of fat	CO5	K4,P	Demonstrate the melting point of fat in fats and oilseeds	K4, S1
9.	Determination of total fat content	CO5	K4,P	Calculate the total fat content present in the different samples	K4, S2
10.	Tests for oils	CO5	K3,P	Identify the potential problems of oils	K4, S1
Milk and Milk Products					
11.	Detection of components in milk	CO6	K4,P	Identify the components present in different milk and milk products	K4, S2
Spices and Condiments, Sugar and Jaggery					
12.	Test for adulterants	CO7	K4,P	Demonstrate the various <i>adulterants</i> present in the spices, <i>condiments, sugar and Jaggery</i>	K4, S1

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5	Manuals of food quality control 8. Food analysis: quality, adulteration and tests of identity, (1997) ISBN 92-5-102412-X
6	FSSAI Manuals for Quality testing (www.fssai.gov.in)
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1	Journal of Food Science and Technology, AFSTI publications.
2	Journal of Food Quality, Published by Wiley, ISSN-0146-9428
3	International journal of Food science and technology, Edited by: Charles Brennan, Vol-55, ISSN:1365-2621
4	Journal of Food Quality and Hazards Control Published by Shahid Sadoughi University of Medical Sciences, ISSN:2345-685X

Course Name	Food for Disease	Programme Name	B.Voc. - Food Science and Nutrition
Course Code	15BFSNEL03	Academic Year	2019-2020
Type of Course	Theory	Semester	V Semester

COURSE OUTCOMES:

On completion of the course, the students will be able to											
C01	Learn the concept and regulatory issues including Codex of nutraceutical										
C02	Understand the properties of nutrient components										
C03	Study the different types of nutraceutical potential foods										
C04	Learn the vital role of nutraceutical and functional food in disease										
C05	Understand the nutraceutical manufacturing process										
C06	Learn the testing techniques and methods for analysis										
Mapping of COs with POs, PSOs											
COs / POs & PSOs	PO(T)	PO(E)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PO(A)	PSO1	PSO2	PSO3
C01	3	1	2	3	2	3	2	3	3	3	3
C02	3	1	2	3	2	3	2	3	3	3	3
C03	3	1	2	3	2	3	2	3	3	3	3
C04	3	1	2	3	2	3	2	3	3	3	3
C05	3	1	2	3	2	3	2	3	3	3	3
C06	3	1	2	3	2	3	2	3	3	3	3
1 – Slight, 2 – Moderate, 3 – Substantial											

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module Title	Objectives	Hours of Instruction L+Tu+Te=To
Introduction to nutraceuticals and functional food	To learn the concept and regulatory issues including Codex of nutraceutical	3+2+1= 6
Nutraceutical properties of nutrient component of food	To understand the properties of nutrient components	6+3+1=10
Nutraceutical potential of food	To study the different types of nutraceutical potential foods	6+3+1=10
Nutraceutical and functional food in diseases	To learn the vital role of nutraceutical and functional food in disease	10+3+1=14
Manufacturing of Nutraceuticals	To understand the nutraceutical manufacturing process	4+3+1=8
Testing and evaluation of nutraceuticals	To learn the testing techniques and methods for analysis	2+3+1=6
Total Hours of Instruction		54(18x3)

L-Lecture, Tu-Tutorial, Te-Tests, To-Total Hours

COURSE PLAN :

Unit/Chapters	Intended learning Outcomes	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
Unit-I Introduction to nutraceuticals and functional food					

1.	Definition, synonymous terms Basis of claims for a compound as nutraceutical Regulatory issues for nutraceuticals including CODEX	C01	K2,C	Collect literature review presentation of regulatory issues including Codex	K5, S1
Unit-II Nutraceutical properties of nutrient component of food					
2.	Nutraceutical properties of a. polysaccharides b. bioactive lipids c. bioactive peptides d. bioactive polyphenols and carotenoids e. vitamins	C02	K2,P	Illustrate and classify the nutrient components of food in nutraceutical aspect	K4, S1
Unit-III Nutraceutical potential of food					
3.	Nutraceutical potential of a. Cereals, pulses, millets, pseudo cereals b. Fruits and vegetables c. Nuts and oilseeds d. Milk e. Meat, egg, fish and poultry f. Spices and condiments g. Seaweeds, tea and honey	C03	K2,C	Pictorial representation (PPT) of any one of the food items	K2,S2
Unit-IV Nutraceutical and functional food in diseases					
4.	Concept of angiogenesis and the role of nutraceuticals/ functional foods	C04	K2,C	Focus on emerging concept in angiogenesis	K4,S1
5.	Nutraceuticals for cardiovascular diseases, gastrointestinal disorders, renal diseases, cancer, diabetes, cholesterol management, obesity, joint pain, immune enhancement, age-related macular degeneration, endurance performance and mood disorders	C04	K2,C	Point out the emerging era in the nutraceutical treatment	
Unit-V Manufacturing of Nutraceuticals					
6.	Manufacturing aspects of selected nutraceuticals such as lycopene, isoflavonoids, prebiotics and probiotics, glucosamine, phytosterols etc.	C05	K2,P	Categorize the manufacturing process of nutraceuticals (lycopene, isoflavonoids, prebiotics and probiotics, glucosamine, phytosterols)	K5,S4
7.	Formulation of functional foods containing nutraceuticals – stability and analytical issues, labelling issues	C05	K2,P	Assess the analytical issues of functional foods	K2,S1
Unit-VI Testing and Evaluation of Nutraceuticals					
8.	Clinical testing of	C06	K2,C	Criticize the	K6,S1

	nutraceuticals and health foods			clinical trials of nutraceuticals	
9.	Interactions of prescription drugs and nutraceuticals, Adverse effects and toxicity of Nutraceuticals	CO6	K2,P	Point out the interactions between synthetic drugs and nutraceuticals	K4,S3
10.	Nutrigenomics and its relation to nutraceuticals	CO6	K2,C	Examine the nutrigenomics	K3,S1

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14.	Robert E.C. Wildman, <i>Handbook of Nutraceutical and Functional foods</i> , II edition, CRC press, 2006
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3.	Santini, A., Cammarata, S. M., Capone, G., Ianaro, A., Tenore, G. C., Pani, L., & Novellino, E. (2018). Nutraceuticals: Opening the debate for a regulatory framework. <i>British journal of clinical pharmacology</i> , 84(4), 659-672.
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Course Name	Food Industrial by-products and Waste Management	Programme Name	B.Voc. - Food Science and Nutrition
Course Code	18BFSNC13	Academic Year	2019-2020
Type of Course	Theory	Semester	VI Semester

COURSE OUTCOMES:

On completion of the course, the students will be able to											
CO1	Learn the different kinds of waste from food industry										
CO2	Understand the waste management system through different types of methods										
CO3	Elaborate the utilization of by products from organic food waste material										
Mapping of COs with POs, PSOs											
COs / Pos & PSOs	PO(T)	PO(E)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PO(A)	PSO1	PSO2	PSO3
CO1	3	1	2	3	2	3	2	3	3	3	3
CO2	3	1	2	3	2	3	2	3	3	3	3
CO3	3	1	2	3	2	3	2	3	3	3	3
1 – Slight, 2 – Moderate, 3 – Substantial											

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module Title	Objectives	Hours of Instruction L+Tu+Te=To
Food industry by-products and waste	To learn the different kinds of waste from food industry	5+4+1= 10
Waste treatment methods	To understand the waste management system through different types of methods	7+4+1=12
Utilization of fruits, vegetables and sugar by-products and waste	To elaborate the utilization of by products from organic food waste material	6+3+1=10
Utilization of by-products from cereals, millets, pulses, oilseeds and tuber crops		8+3+1=12
Utilization of by-products from Animal products based industries		6+3+1=10
Total Hours of Instruction		54

L-Lecture, Tu-Tutorial, Te-Tests, To-Total Hours

COURSE PLAN

Unit/Chapters	Intended learning Outcomes	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
Unit-I Food industry by-products and waste					
1.	Introduction Status in India Types of waste and by-products from food industries	CO1	K2,F	Illustrate the types of wastes and its by products produced by food industry sector	K4, S2

2.	Composition and characterization Need for treatment and utilization Impact on environment	CO1	K2,C	Point out the treatment and utilization impact on environment	K4,S1
Unit-II Waste treatment methods					
3.	Membrane separation, advanced oxidation/reduction, electrolytic methods, up-flow anaerobic sludge blanket (UASB), aerobic and anaerobic methods, activated sludge treatment, sludge thickening, sludge conditioning, sludge dewatering, composting and incineration, land filling, vermicomposting.	CO2	K2,P	Compare and summarize the different kinds of methods used for reuse from the waste item	K5, S1
Unit-III Utilization of fruits, vegetables and sugar by-products and waste					
4.	Types of waste in fruits and vegetable processing industries. Process for waste utilization from fruit and vegetable industries	CO3	K2,C	Appraise the process of waste utilization from fruit and vegetables in the food industry	K6,S2
5.	Fermentation for production of alcohol and vinegar, oil & flavoring components, pigments extraction and acid production from waste By products utilization of sugar industry	CO3	K2,P	Visit nearby industry and enlist the waste management that you have observed in foods. Discuss it with your peer group	K5,S3
Unit-IV Utilization of by-products from cereals, millets, pulses, oilseeds and tuber crops					
6.	Utilization of by products from wheat, rice, corn, dhal milling Utilization of husk, bran, cob, germ, broken and powder	CO3	K2,C	Illustrate the waste management from the cereals	K3,S2
	Oil processing industries – Introduction, De-oiled cake, animal feed, fertilizer, bio sorbents, waxes, soap stock, cocoa butter replacer. Tuber processing industries- Introduction, enzyme production, biogas, bakers yeast, bioethanol, animal feed, corn syrup, organic acids, nutraceuticals.	CO3	K2,C	Distinguish the techniques used in oil and tuber processing industries	K6,S4
Unit-V Utilization of by-products from Animal products based industries					
7.	Dairy industry - Introduction- opportunities –	CO3	K2,P	Collect videos on working methods and	K6,S1

	whey, bio surfactants, bacteriocin. Meat, fish, poultry and egg processing industries- bio active peptide, protein extract, gelatin, heparin, pepsin, bio molecule from bone and blood, keratin from animal hair, bone meal, meat meal, chondroitin sulfate, squalene, fish oil, micro nutrients- vitamins and minerals, pigments.			discuss it	
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Course Name	Food Trade And Business Management	Programme Name	B.Voc. Food Science and Nutrition
Course Code	18BFSNC14	Academic Year Introduced	2018 - 19
Type of Course	Theory	Semester	VI

COURSE OUTCOMES

On completion of the course, the students will be able to											
C01	Appraise concepts, functions and process of entrepreneurship										
C02	Understand the Business plan, Process components of business and its technology licensing										
C03	Understand the Concept of E-business, E-commerce and formulate the various Techniques of market research										
C04	Appreciate the importance of Cash Register, Cash Flow Projections in the smooth flow of finances in the business										
C05	Identify the different types of resources, size and capital based classification of business enterprises										
C06	Understand the agricultural Trade Policy, goals, Food Policy, Import and export procedures in India										
C07	Differentiate the various Business Development Services and its Financial Institutions and Banks										
Mapping of COs with POs, PSOs											
COs / POs & PSOs	PO (T)	PO (E)	PO (P1)	PO (P2)	PO (P3)	PO (P4)	PO (P5)	PO (A)	PSO1	PSO2	PSO3
C01	3	1	2	3	2	3	2	3	3	3	3
C02	3	1	2	3	2	3	2	3	3	3	3
C03	3	1	2	3	2	3	2	3	3	3	3
C04	3	1	2	3	2	3	2	3	3	3	3
C05	3	1	2	3	2	3	2	3	3	3	3
1 – Slight, 2 – Moderate, 3 – Substantial											

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction L+Tu+Te=To
Entrepreneurship Concepts	To impart knowledge about concepts and functions of entrepreneurship	6+1+1= 8
Start-up and Business Plan	To provide learning on Business Planning Process and Technology licensing	5+1+1= 7
Concept of Market and Marketing Mix	To elaborate the Concept of Market and Techniques of Marketing Mix	5+1+1= 7
Business Finance and Arithmetic	To Understand the importance and technique of preparing a Finance and arithmetic	9+1+2=12
Resource Mobilization	To Describe the planning effective resource mobilization and sources of business information	6+0+1= 7
Trade and Policies	To impart knowledge on agricultural trade, Sustainable Development goals and policy in India	5+1+0= 6
Business Development Services	To Describe the various Business Development Services and its uses	5+0+2= 7
Total Hours of Instruction		54 (18x4)

L-Lecture, Tu-Tutorial, Te-Tests, To-Total Hours

COURSE PLAN

Unit/ Module	Intended learning Outcomes	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
Unit-1-Entrepreneurship Concepts					
1.	Concept and Functions of entrepreneurship,	CO1	K2, F	List five such similar examples which have marked their place for innovation.	K6,S4
2.	Need and Myths of entrepreneurship, process of entrepreneurship,	CO1	K2, C		
3.	Types, competencies and ethics of entrepreneurship,	CO1	K1, C		
4.	Intrapreneurship, social entrepreneurship, food preneurship.	CO1	K2, C	To collect information about any three different field of entrepreneurs	K4,S4
Unit-2 Start-up and Business Plan					
5.	Objectives of a Business plan, Business Planning Process,	CO2	K2, C	Visit a market to identify the people needs and write a new business plan	K4,S3
6	Opportunity Identification and Selection, Contents of a Business Plan,	CO2	K1, F		
7	Execution of business plan, Feasibility analysis,	CO2	K2, C	Survey and list the reasons for buying the packed foods	K4,S3
8	Innovations leading to entrepreneurial ventures,	CO2	K2, C		
9	Components of business-industry, trade and commerce,	CO2	K2, F	Visit one food industry and prepare a report about Business trade and commerce	K3,S2
10	Technology licensing, intellectual property law, patents, trademarks and copyright.	CO2	K2, F	Develop scrapbook on current intellectual property laws	K5,S4
Unit- 3 Concept of Market and Marketing Mix					
6.	Concept of market and its evolution, E-business and E-commerce,	CO3	K1,C	Collect any five products their punch line and their logo.	K6,S4
7.	Market environment at micro and macro level, Techniques of market research	CO3	K2, C	Assemble the groups of three organize a trade show for any ten states of India, through power point presentation	K3,S2
8.	Market survey, Market expansion, marketing mix	CO3	K2, C	Collect a newspaper article analyzing the current and traditional market conditions.	K4,S4
Unit-4 Business Finance and Arithmetic					
9.	Cash register, unit of sale, unit cost and unit price, types of cost, income statement,	CO4	K2, C	Prepare a presentation on how revolutions or inventions helped in trade	K5,S3
10.	Cash flow projections, break-even analysis for a single product or service, taxes	CO4	K2, C	Develop a product and fix it break-even analysis and taxes	K6,S3
Unit-5- Resource Mobilization					

11.	Planning effective resource mobilization, estimating financial requirements,	C05	K1, F	Prepare a report on resource mobilization	K3,S3
12.	estimate capital requirement, sources of finance, mentorship,	C05	K2, C	Organize a talk show discussing the role and importance of mentor of any entrepreneur of your choice.	K5,S4
13.	size and capital based classification of business enterprises, sources of business information, ICT in business	C05	K1, C		
Unit-6- Trade and Policies					
14.	India's Agricultural Trade Policy and Sustainable Development goals	C06	K2, C	Collect information about important government schemes in Agriculture sector	K4,S4
15.	Food Policy in India, Import and export procedures and guidelines in India	C06	K2, F	Do a presentation on Import and export procedures followed by various food product in India	K4,S4
Unit-7-Business Development Services					
16.	Business development service providers in India - DIC, MSME, NSIC, SIDCO, Financial Institutions and Banks.	C07	K2, C	Report the Services Companies in India and the policy of Government for promoting a micro, small and medium enterprises	K3,S3

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3	S.S.Khanka (2012), Entrepreneurial Development, 4 th Edition, S.Chand & Company Ltd.,.
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JOURNALS AND DOCUMENTS	
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2	Journal of Hotel and Business Management
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4	International Journal of Food and Beverage Manufacturing and Business Models, Published by timely knowledge
5	Journal of Commerce And Trade, Published by Dr Himanshu Agarwal

Course Name	Nutrition Assessment and Diet Planning Practical	Programme Name	B.Voc. - Food Science and Nutrition
Course Code	18BFSNC15	Academic Year	2019-2020
Type of Course	Practical	Semester	VI Semester

COURSE OUTCOMES:

On completion of the course, the students will be able to											
CO1	Understand the nutritional assessment methods										
CO2	Learn the planning techniques, meal distribution and nutrient calculation for non communicable disease										
Mapping of COs with POs, PSOs											
COs / Pos & PSOs	PO(T)	PO (E)	PO (P1)	PO (P2)	PO (P3)	PO (P4)	PO (P5)	PO (A)	PSO1	PSO2	PSO3
CO1	1	3	3	3	3	3	3	3	3	3	3
CO2	1	3	3	3	3	3	3	3	3	3	3
1 – Slight, 2 – Moderate, 3 – Substantial											

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module Title	Objectives	Hours of Instruction L+Tu+Te=To
Methods of Assessments	To understand the nutritional assessment methods	3+7+4= 14
Planning, preparation and calculation of diet for specific conditions	To learn the planning techniques, meal distribution and nutrient calculation for non communicable disease	10+20+10= 40
Total Hours of Instruction		54

L-Lecture, Tu-Tutorial, Te-Tests, To-Total Hours

COURSE PLAN

Unit/Chapters	Intended learning Outcomes	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
Unit-I Methods of Assessments					
1.	Anthropometric Assessments of Individuals	CO1	K2,C	Measure individual's height, weight, BMI, MUAC, WHR, Head and chest circumference and discuss it.	K6,S2
2.	Case study on Biochemical Assessments of Individuals			Collect the blood analysis report from different patients and discuss it.	K5, S1
3.	24 hr recall method Three days recall method			Calculate the nutrient from previous day menu and past three days menu	K4, S1
Unit-II Planning, preparation and calculation of diet for specific conditions					
4.	a) Normal diet b) Liquid diet c) Soft diet d) High and low caloric diet e) Bland diet for peptic ulcer f) Diet for Viral hepatitis	CO2	K2,P	Plan a menu for each specific condition and calculate the nutrient content for proper utilization of nutrients	K5,S5

	and cirrhosis g) Diet for Diabetes mellitus h) Diet for Hypertension and Atherosclerosis i) Diet for Nephritis and Nephrotic syndrome k) Low and medium cost diets for P.E.M., Anemia & vitamin A deficiency				
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Course Name	Nutrition and Physical Fitness	Programme Name	B.Voc Food Science and Nutrition
Course Code	15BFSNEL04	Academic Year Introduced	2019- 20
Type of Course	Theory	Semester	VI

COURSE OUTCOMES

COURSE OUTCOMES											
On completion of the course, the students will be able to											
CO1	Understand the physiological systems ,its role and functions										
CO2	Determine the energy expenditure and devise a plan for energy balance										
CO3	Specify the significance of cardiorespiratory assessment, training and fitness										
CO4	Get insight into muscular fitness and its assessment and skill related training										
CO5	Recommend fitness training in geriatric and mentally challenged population ,pregnant and lactating women										
CO6	Formulate diet plans for athletes and suggest supplements										
Mapping of COs with POs, PSOs											
COs / POs & PSOs	PO(T)	PO(E)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PO(A)	PSO1	PSO2	PSO3
CO1	3	1	2	3	2	3	2	3	3	3	3
CO2	3	1	2	3	2	3	2	3	3	3	3
CO3	3	1	2	3	2	3	2	3	3	3	3
CO4	3	1	2	3	2	3	2	3	3	3	3
CO5	3	1	2	3	2	3	2	3	3	3	3
CO6	3	1	2	3	2	3	2	3	3	3	3
1 – Slight, 2 – Moderate, 3 – Substantial											

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction L+Tu+Te=To
Physiological System	To learn about the physiological systems ,its role and functions	5
Energy Balance and Body Composition	To familiarize with the concept of Energy Balance and Body Composition	5
Cardiorespiratory Training and Fitness	To provide learning on Cardiorespiratory Training and Fitness	12
Muscular Endurance and Skill related fitness	To learn the concept of muscular and skill –related fitness	10
Geriatric fitness and fitness of physically and mentally challenged population	To impart knowledge on Training Geriatric ,physically challenged and mentally challenged population	12
Nutrition for Exercise	To define nutritional requirements for athletes and supplements	10
Total Hours of Instruction		54

L-Lecture, Tu-Tutorial, Te-Tests, To-Total Hours

COURSE PLAN

Unit/Chapters	Intended learning Outcomes	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
UNIT I Physiological System					
1.	Structure and function - Cell,	CO1	K1,F	Classify and Illustrate types of animal cell with its component	K4,S1

2.	Skeletal system,	C01	K1,F	Sketch a bones, label it and identify its significance and problems associated with it	K3,S2
3.	Blood and Circulatory system,	C01	K1,F	Demonstrate the blood grouping ,blood coagulation time and bleeding time	K3,S1
4.	Gastro-intestinal system,	C01	K1,F	Design a poster about components of gastro-intestinal, excretory system, respiratory and endocrine system with accurate information	K6,S3
5.	Excretory system,	C01	K1,F		
6.	Respiratory system	C01	K1,F		
7.	Endocrine system	C01	K1,F		
UNIT II: Energy Balance and Body Composition					
8.	Energy balance, components of energy expenditure,	C02	K2,C	Make a presentation on components of energy expenditure	K6,S2
9.	Body composition components and its determination,	C02	K2,P	Develop a scrapbook about determination of body composition	K6,S3
10.	Energy system for exercise and performance	C02	K2,C	Differentiate aerobic and anaerobic exercises and energy spent on each event	K4,S2
11.	Dietary guidelines for energy balance	C02	K2,C	List out the dietary guidelines for energy balance	K2,S2
UNIT III: Cardiorespiratory Training and Fitness					
12.	FITT principle, physical activity pyramid	C03	K2,C	Create an assessment sheet for skill related fitness and do a trial with your classmates	K6,S4
13.	Cardiovascular fitness assessment,	C03	K2,P		
14.	Cardiovascular conditioning by aerobic exercise	C03	K3,C	Perform a demonstration class on cardiovascular conditioning (by students)	K3,S1
UNIT IV: Muscular Endurance and Skill related fitness					
15.	Muscular endurance fitness assessment	C04	K2,P	Conduct fitness assessment in your class and interpret the results of your classmates	K3,S4
16.	Skill related fitness assessment,	C04	K2,P		
17.	Endurance training,	C04	K3,C		
18.	Strength training,	C04	K3,C		
19.	Calisthenics, flexibility training	C04	K3,C		
UNIT V: Geriatric fitness and fitness of physically and mentally challenged population					
20.	Geriatric population fitness assessment and Training issues	C05	K2,C	Create a manual for simple exercise plan and yoga for elderly people .(with pictures)to maintain fitness and contradiction	K6,S5
21.	Physically and mentally challenged population fitness assessment Training issues	C05	K2,C	Do a systematic review of journal presentation about effect of physical activity in improvement of mental health in physically challenged population	K2,S2
22.	Training issues for	C05	K2,C	Bring articles and	K4,S3

	pregnant and lactating mother			information on pregnant and lactating women who excelled in sports and analyse their diet pattern (ex. Serena Williams ,Alysia Montano)	
UNIT VI: Nutrition for Exercise					
23.	Assessment of Nutritional Fitness,	CO6	K2,P	Demonstrate Fitness Assessment	
24.	Nutrition during, before and after exercise, fluid balance	CO6	K3,C	Do systematic review of journal presentation about beneficial nutrients in sports	K4,S3
25.	Dietary supplements	CO6	K2,C	Choose one supplement and prepare a portfolio for the supplement	K6,S3

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TEXTBOOKS	
1	Fink, H. H., & Mikesky, A. E. (2017). Practical applications in sports nutrition. Jones & Bartlett Learning.
2	Bean, A. (2017). The complete guide to sports nutrition. Bloomsbury Publishing.
3	McArdle, W. D. (2018). Sports and exercise nutrition. Lippincott Williams & Wilkins. Fourth edition
4	Joshi, S. A. (1995). Nutrition and dietetics. McGraw-Hill Education.
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1	Benardot, D. (2011). Advanced sports nutrition. Human Kinetics.
2	Colgan, M. (2002). Sports Nutrition Guide: Minerals, Vitamins & Antioxidants for Athletes. Apple publishing.
3	Srilakshmi, B. (2019). Dietetics, new age international (P) Ltd. Publishers, New Delhi, 145-162.
4	Bean, A. (2009). Food for fitness. A&C Black.
JOURNALS AND DOCUMENTS	
1	Journal of the international Society of Sports Nutrition, Springer Nature
2	International Journal of Athletic therapy and Training, Human Kinetics Publishers. Inc.
3	Journal of Exercise Science and Fitness, Elsevier
4	Food Science and Human Wellness, Beijing Academy of Food Sciences

Course Name	IT Applications in Food Industry	Programme Name	B.Voc Food Science and Nutrition
Course Code	15BFSNC16	Academic Year Introduced	2018 - 19
Type of Course	Practical	Semester	VI

COURSE OUTCOMES

On completion of the course, the students will be able to											
CO1:	To use Word document, Microsoft Excel, the Power point presentation for recognize its application in communication and documentation, for maintaining the balance sheets and account										
CO2:	To able to work in the food industry specific ERP software										
CO3:	To get the idea about automation software in Food industry										
Mapping of COs with POs, PSOs											
COs / POs & PSOs	PO(T)	PO(E)	PO(P1)	PO(P2)	PO(P3)	PO(P4)	PO(P5)	PO(A)	PSO1	PSO2	PSO3
CO1	1	3	2	2	3	3	3	3	3	3	3
CO2	1	3	2	2	3	3	3	3	3	3	3
CO3	1	3	2	2	3	3	3	3	3	3	3
1 – Slight, 2 – Moderate, 3 – Substantial											

COURSE OBJECTIVES AND HOURS OF INSTRUCTION

Unit/Module	Objectives	Hours of Instruction Tu+P+Te=To
Microsoft Office	To familiarize with the basics and functions of Microsoft office applications	18
Enterprise Resource Planning (ERP) software	To learn the Enterprise Resource Planning and employ it in Food industry	18
Automated software	To recognize the value of automated software in Food industry	18
Total Hours of Instruction		54

Tu-Tutorial, P-Practical, Te-Tests, To-Total Hours

COURSE PLAN

Module/Experiment No.	Intended learning Chapters	CO(s) Mapped	Cognitive Level / KD	Psychomotor domain activity	Psychomotor domain level
Module 1: Microsoft office					
1.	Microsoft Word	CO1	K3,P	To create a Microsoft Word Document and to learn the functions of Microsoft word document and access it .	S3
2.	Microsoft Excel	CO1	K3,P	To create a Microsoft Excel and to learn the functions of Microsoft Excel and access it	S3
3.	Microsoft Power point Presentation	CO1	K3,P	To create a Microsoft Power point presentation, to access and apply it for the development of the pamphlet and label.	S3
Module II: Enterprise Resource Planning					
4.	ERP software	CO2	K3,C	To get trained on ERP software and its application specific to the food industry	S2

Module III: Automated Software					
5.	Automated Software	CO3	K2,C	To gain knowledge on the automation softwares through an industrial visit	S2

REFERENCES

TEXTBOOKS	
1	Singh, R. P. (1996). Computer Applications in Food Technology: Use of Spreadsheets in Graphical, Statistical, And Process Analysis. Elsevier.
2	Teixeira, A. A., & Shoemaker, C. F. (2012). Computerized food processing operations. Springer Science & Business Media.
3	Sinha, P. K., & Sinha, P. (2016). Information Technology: Theory and Practice. PHI Learning Pvt. Ltd..
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1	Vlach, J. (1992). Basic Network Theory: With Computer Applications. New York: Van Nostrand Reinhold.
2	Gunasekaran, S. (1996). Computer vision technology for food quality assurance. Trends in Food Science & Technology, 7(8), 245-256.
3	Sinha, P. K., & Sinha, P. (2003). Computer Fundamentals .BPB Publications (sixth edition)
JOURNALS AND DOCUMENTS	
1	International Journal of Supply Chain Management, Exceling Tech Publishers
2	Trends in Food Science and Technology ,Elsevier
3	IFIP Advances in Information and Communication Technology ,Springer Nature