



॥ सा विद्या या विमुक्तये ॥

स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड

'ज्ञानतीर्थ', विष्णुपुरी, नांदेड - ४३१ ६०६ (महाराष्ट्र राज्य) भारत

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

'Dnyanteerth', Vishnupuri, Nanded - 431 606 (Maharashtra State) INDIA

Established on 17th September, 1994, Recognized By the UGC U/s 2(f) and 12(B), NAAC Re-accredited with 'B++' grade

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विज्ञान व तंत्रज्ञान विद्याशाखे अंतर्गत
राष्ट्रीय शैक्षणिक धोरण-२०२० नुसार
पदवी तृतीय वर्षाचे अभ्यासक्रम
(Syllabus) शैक्षणिक वर्ष २०२६-२७
पासून लागू करण्याबाबत.

प रि प त्र क

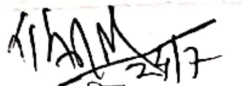
या परिपत्रकान्वये सर्व संबंधितांना कळविण्यात येते की, दिनांक २२ एप्रिल २०२६ रोजी संपन्न झालेल्या मा.विद्यापरिषद बैठकीतील विषय क्र.०८/६४-२०२६ च्या ठरावानुसार विज्ञान व तंत्रज्ञान विद्याशाखेतील राष्ट्रीय शैक्षणिक धोरण-२०२० नुसार पदवी तृतीय वर्षाचे अभ्यासक्रम (Syllabus) शैक्षणिक वर्ष २०२६-२७ पासून लागू करण्यास मा.विद्यापरिषदेने मान्यता प्रदान केली आहे. त्यानुसार विज्ञान व तंत्रज्ञान विद्याशाखेतील बी.एस्सी. तृतीय वर्षाचे खालील विषयाचे अभ्यासक्रम (Syllabus) शैक्षणिक वर्ष २०२६-२७ पासून लागू करण्यात येत आहे.

01	B.Sc. III Year Food Science (Affiliated Colleges)
02	B.Sc. III Year Biophysics (Affiliated Colleges)

सदरील परिपत्रक व अभ्यासक्रम प्रस्तुत विद्यापीठाच्या www.srtmun.ac.in या संकेतस्थळावर उपलब्ध आहेत. तरी सदरील बाब ही सर्व संबंधितांच्या निदर्शनास आणून द्यावी, ही विनंती.

'ज्ञानतीर्थ' परिसर,
विष्णुपुरी, नांदेड - ४३१ ६०६.
जा.क्र.:शै-१/परिपत्रक/पदवी/बीएस्सी/२०२६-२७/११७
दिनांक : २४.०७.२०२६




उपकुलसचिव
शैक्षणिक (१-अभ्यासमंडळे) विभाग

प्रत माहिती व पुढील कार्यवाहीस्तव :-

- १) मा. कुलगुरू महोदयांचे कार्यालय, प्रस्तुत विद्यापीठ.
- २) मा. प्र.कुलगुरू महोदयांचे कार्यालय, प्रस्तुत विद्यापीठ.
- ३) मा. अधिष्ठाता, विज्ञान व तंत्रज्ञान विद्याशाखा, प्रस्तुत विद्यापीठ.
- ४) मा. संचालक, परिक्षा व मुल्यमापन मंडळ, प्रस्तुत विद्यापीठ.
- ५) मा. प्राचार्य, सर्व संबंधित संलग्नित महाविद्यालये, प्रस्तुत विद्यापीठ.



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**SWAMI RAMANAND TEERTH
MARATHWADA UNIVERSITY,
NANDED - 431 606 (MS)**



**(Credit Framework and Structure of Four Year UG Program with
Multiple Entry and Exit Option as per NEP-2020)**

**UNDERGRADUATE PROGRAMME OF
SCIENCE & TECHNOLOGY**

B.sc. Food Science

Major in **DSC** and Minor in **DSM** (Subject)

Under the Faculty of Science & Technology

(Revised as per the Govt. Of Maharashtra circular dt. 13th March 2024)



SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED - 431 606

B. Sc. Third Year Semester Five (Level 4.5)

Teaching Scheme

Subject(1)	Course Code	Course Name	Credits Assigned			Teaching Scheme (Hrs/ week)	
			Theory	Practical	Total	Theory	Practical
Major Subject	SFSCCT-1301	Specialty Food	03	--	12	03	--
	SFSCCT-1302	Food Process Equipment	03	--		03	--
	SFSCCT-1303	Principles of traditional food processing	02			02	--
	SFSCCP-1301	Lab course in Specialty Food	--	02			04
	SFSCCP-1302	Lab course in Food Process Equipment	--	02			04
Open Elective	SFSCET-1301 A-B	A) Techniques in food analysis B) Food Hygiene and Microbial Standards	03	-	04	03	--
	SFSCEP-1301 A-B	Practical based on SFSCCT-1301	--	01			04
Vocational Course(related to major)	SFSCVC-1301	Processing of Vegan Foods	--	02	02	--	04
Community Engagement Course(CC)	SFSCFP-1301	Experimental Learning Program	--	04	04	--	04
Total Credits			11	11	22	11	20



B. Sc. Third Year Fifth Semester (Level 5.5)

Examination Scheme

[40% Continuous Assessment (CA) and 60% End Semester Assessment (ESA)]

(For illustration we have considered a paper of 02 credits, 50 marks, need to be modified depending on credits assigned to individual paper)

Subject(1)	Course Code (2)	Course Name (3)	Theory				Practical		Total Col (6+7) / Col (8+9) (10)
			Continuous Assessment (CA)			ESA			
			Test I (4)	Test II (5)	Average of T1 & T2 (6)	Total (7)	CA (8)	ESA (9)	
Major Subject	SFSCCT-1301	Specialty Food	20	20	20	30	--	--	75
	SFSCCT-1302	Food Process Equipment	20	20	20	30	--	--	50
	SFSCCT-1303	Principles of traditional food processing	10	10	20	30	--	--	50
	SFSCCP-1301	Lab course in Specialty Food	--	--	--	--	20	30	50
	SFSCCP-1302	Lab course in Food Process Equipment	--	--	--	--	20	30	50
Open Elective	SFSCET-1301 A-B	A) Techniques in food analysis B) Food Hygiene and Microbial Standards	20	20	20	30	--	--	50
	SFSCEP-1301 A-B	Practical based on SFSCCT-1301	--	--	--	--	10	15	25
Voctional Courses (relted to major)	SFSCVC-1301	Processing of Vegan Foods	--	--	--	--	20	30	50
Community Engagement Course(CC)	SFSCFP-1301	Experimental Learning Program	--	--	--	--	40	60	100



SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED - 431 606

B. Sc. Second Year Six Semester (Level 4.5)

Teaching Scheme

Subject	Course Code(2)	Course Name	Credits Assigned			Teaching Scheme (Hrs./ week)	
			Theory	Practical	Total	Theory	Practical
Major Subject	SFSCCT-1351	Extrusion Technology	03	--	13	03	--
	SFSCCT-1352	Food Plant Design Layout	03	--		03	--
	SFSCCT-1353	Food Quality, Safety Standards And Certification	03	--		03	04
	SFSCCP-1351	Lab course in Extrusion Technology	--	02		--	04
	SFSCCP-1352	Lab course in Food Plant Design Layout	--	02		--	04
Open Elective	SFSCET-1351 A-B	A) Food Biotechnology B) New Product Development	03	--	04	03	--
	SFSCEP-1351 A-B	Practical based on SFSCET-1351 (A-B)	--	01		--	01
Skill enhancement Course (related to Major)	SFSCVC-1301	Processing of Fermented Foods	--	02	02	--	04
Project/Field Work/OJT/Internship	SFSCFP-1351	Micro Project	--	04	04	--	04
Total Credits			12	11	23	12	21



B. Sc. Third Year Sixth Semester (Level 4.5)

Examination Scheme

[20% Continuous Assessment (CA) and 80% End Semester Assessment (ESA)]

(For illustration we have considered a paper of 02 credits, 50 marks, need to be modified depending on credits assigned to individual paper)

Subject (1)	Course Code (2)	Course Name (3)	Theory				Practical		Total Col (6+7) / Col (8+9) (10)
			Continuous Assessment (CA)			ESA			
			Test I (4)	Test II (5)	Average of T1 & T2 (6)	Total (7)	CA (8)	ESA (9)	
Major Project	SFSCCT-1351	Extrusion Technology	20	20	20	30	--	--	50
	SFSCCT-1352	Food Plant Design Layout	20	20	20	30	--	--	50
	SFSCCT-1353	Food Quality, Safety Standards And Certification	20	20	20	30	--	--	50
	SFSCCP-1351	Lab course in Extrusion Technology	--	--	--	--	20	30	50
	SFSCCP-1352	Lab course in Food Plant Design Layout	--	--	--	--	20	30	50
Open Elective	SFSCET-1351 A-B	A) Food Biotechnology B) New Product Development	20	20	20	30	--	--	50
	SFSCEP-1351 A-B	Practical based on SFSCET-1351 (A-B)	--	--	--	--	20	30	50
Skill Based Course	SFSCVC-1301	Processing of Fermented Foods	--	--	--	--	20	30	50
Community Engagement Course	SFSCFP-1351	Micro Project	--	--	--	--	40	60	100

Course Structure: Major 1 -Teaching Scheme
SFSCCT-1301: Specialty Foods (Major 1)
Curriculum Details

Course Code	Course Name (Paper Title)	Teaching Scheme (Hrs.)		Credits Assigned		
		Theory	Practical	Theory	Practical	Total
SFSCCT-1301	Specialty Foods	32	48	02	02	04

Assessment Scheme

Course Code (2)	Course Name (3)	Theory				Practical		Total [Col (6+7) or Col (8+9)] (10)
		CA			ESA (7)			
		Test I (4)	Test II (5)	Avg of T1 & T2 (6)		CA (8)	ESA (9)	
SFSCCT-1301	Specialty Foods	20	20	20	30	20	30	100

Course Pre-requisite:

Student should have the basic knowledge of food processing, food quality, food sources.

Course Objectives:

1. After successful completion of this course students will be able to learn processing various kinds of specialty food. To understand the functions of foods.
2. To learn about the various types of food.

Course Outcomes:

After successful completion of this course students will be learning about food formulation, processing and preservation for various food types. This includes traditional and modern technology.

Curriculum Details: (There shall be FOUR Modules in each course)

Module No.	Unit No.	Topic	Hrs. Required to cover the contents
1.0		Introduction of specialty food	8 hrs
	1.1	Importance, Need and scope of specialty foods	
	1.2	Specialty food based on ease in preparation cost health Benefit	
	1.3	Convenience food, Low cost foods, Functional foods	
	1.4	Health care and medical benefits, Nutritional	
2.0		Specialty foods based on sources & process	8 hrs
	2.1	Cereals , millets, Legumes and pulses, Probiotics	
	2.2	Fruits and vegetables, byproducts , Animal food sources	
	2.3	Extrusion, baking, Fermentation, frying, canning	
	2.4	Modern processing technology	
3.0		Nutraceutical and therapeutic foods	8 hrs
	3.1	Nutraceutical	
	3.2	Therapeutic foods	
	3.3	Proprietary foods. Supplementary foods.	
	3.4	Specialty food based on genetics Genetically modified foods, Transgenic foods Biotechnological aspects of detoxification	
4.0		Specialty food based on consumer requirement	8 hrs
	4.1	Baby food, Pet Food	
	4.2	Fast food, Junk Food	
	4.3	Specialty foods based on growing condition -organic, inorganic farming	
	4.4	Defense persons Space / astronaut High altitude mountain climbers Disaster situation – crises, care, maintenance	
		Total	32 hrs

Reference Books:

1. Gibson GR & William CM. 2000. Functional Foods - Concept to Product
2. Robert EC. 2006. Handbook of Nutraceuticals and Functional Foods. Ed. Wildman
3. Manson P. 2001. Dietary Supplements. 2nd Ed. Pharmaceutical Press.
4. Bamji MS, Rao NP & Reddy V. 2003. Textbook of Human Nutrition. Oxford & IBH.

SFSCCP-1301 Lab course in Specialty Food

Practical's

Practical No.	Practical's
1	Preparation of specialty foods based on Functionality ii) Convenience iii) Low cost iv) Nutritional purpose
2	Preparation of specialty food using locally available foods crops, fruit and vegetables few products
3	Assessment of byproduct for preparation of value added specialty food
4	Isolation of phytochemical/ bio-reactive agent of plant sources and their utilization in proprietary foods
5	Preparation of specialty food as per requirement of i) Location ii) Nature of work iii) Status of worker
6	Evolution of food cultivated under organic farming conditions
7	Preparation of low fat Product
8	Sensory Evaluation of Specialty foods
9	Shelf-life study of specialty food products
10	Industrial visit to NABL accredited food laboratory.

Course Structure: Major 2 -Teaching Scheme
SFSCCT-1302: Food Process Equipment (Major 2)
Curriculum Details

Course Code	Course Name (Paper Title)	Teaching Scheme (Hrs.)		Credits Assigned		
		Theory	Practical	Theory	Practical	Total
SFSCCT-1302	Food Process Equipment	32	48	02	02	04

Assessment Scheme

Course Code (2)	Course Name (3)	Theory				Practical		Total [Col (6+7) or Col (8+9)] (10)
		CA			ESA (7)			
		Test I (4)	Test II (5)	Avg. of T1 & T2 (6)		CA (8)	ESA (9)	
SFSCCP- 1302	Food Process Equipment	20	20	20	30	20	30	100

Course Pre-requisite:

1. Basic knowledge of food processing, physics and mathematics are required to learn this subject.

Course Objectives:

1. Understand the basic concepts of material handling.
2. Understand the engineering properties of food material
3. Learn about evaporation, Drying, Thermal Processing and equipment's used in various food processing.

Course Outcomes:

After successful completion of this course students will be able to understand material handling machines, pre-treatment unit operation, significance in equipment design, processing and handling of food products, Principles, types, classification, methods and equipment's, mass in thermal processing and Equipment's used in various food processing

Curriculum Details: (There shall be FOUR Modules in each course)

Module No.	Unit No.	Topic	Hrs. Required to cover the contents
1.0		Material Handling	8 hrs.
	1.1	Material handling machines,	
	1.2	Conveyors, Elevators	
	1.3	Pre-treatment unit operation (cleaning, dehulling, de husking, sorting, grading, peeling and forming)	
	1.4	size reduction, separation, agitation and mixing.	
2.0		Engineering Properties of Food material	8 hrs.
	2.1	Introduction, significance in equipment design	
	2.2	Processing and handling of food products, hygienic design of food processing equipment's	
	2.3	Sanitary requirements, sanitary pipes and fittings,	
	2.4	Rheology texture of food material, elastic, plastic and viscous behavior, methods of texture evaluation, subjective, objective measurements.	
3.0		Equipment's used in manufacturing	8 hrs.
	3.1	Membrane processes : Ultra filtration, Reverse osmosis	
	3.2	Centrifugation, Extraction and Leaching	
	3.3	Evaporation, Drying and Thermal Processing	
	3.4	Mechanical separations, Filtration, expression and Irradiation Process	
4.0		Equipment's used in various food processing	8 hrs.
	4.1	Baking, roasting, frying equipment's	
	4.2	Blending and pulverization equipment's	
	4.3	Drying, cooling,	
	4.4	Microwave and Dielectric & Infrared heating: Physical parameters. Heat transfer phenomenon. Equipment and application	
		Total	32 hrs.

Reference Books:

1. Unit operation of chemical engineering- McCabe Smith Harriott
2. Food Engineering Operation- Brennan, Butters, Cowell and Lilly

3. Process Heat transfer- Kern
4. Introduction to food engineering- Heldman D. R. & Singh R. P.
5. Fundamental of food engineering- Charm S. E.

SFSCCP-1302 Lab course in Food Process Equipment

Practical's

Practical No.	Practical's
1	Study of different disintegration operations (slicing, dicing, shredding and pulping)
2	Study of principle and working of roller dryer, cabinet dryer
3	Study of ultra-, infrared moisture meter and universal moisture meter
4	Study of Principle, working and demonstration of hammer mill and crushing roll
5	Study on the sorting and grading of materials
6	Study of evaporator, dryer, sterilizer with their design problem
7	Determine flow parameters of Newtonian, non- Newtonian food products by- capillary tube viscometer, Hokke's viscometer
8	Study of size reduction machineries
9	Study of centrifugal separation (centrifugal cream separation, centrifugal machine)
10	Study on reverse osmosis
11	Study of plate and frame filter press
12	Determination of mixing index of a food mixer

Course Structure: Teaching Scheme

SFSCCT-1303: Principles of Traditional Food Processing Curriculum Details

Course Code	Course Name (Paper Title)	Teaching Scheme (Hrs.)		Credits Assigned		
		Theory	Practical	Theory	Practical	Total
SFSCCT-1303	Principles of Traditional Food Processing	32	48	02	00	02

Assessment Scheme

Course Code (2)	Course Name (3)	Theory				Practical		Total [Col (6+7) or Col (8+9)] (10)
		CA			ESA (7)			
		Test I (4)	Test II (5)	Avg of T1 & T2 (6)		CA (8)	ESA (9)	
SFSCCT-1303	Principles of Traditional Food Processing	20	20	20	30	00	00	-

Course Pre-requisite: Course Prerequisites

Basic knowledge of Food Science / Food Technology fundamentals (composition, structure, and properties of food)
Elementary knowledge of Unit Operations in Food Processing (heat transfer, drying, preservation basics)
General awareness of Indian/regional traditional food practices

Course Objectives:

1. Understand the historical background, significance, and principles underlying traditional food processing methods practiced across different regions/cultures.
2. Gain knowledge of traditional preservation techniques such as fermentation, drying, salting, smoking, pickling, and sun-drying, and the science behind each method.
3. Understand the role of indigenous microorganisms and natural fermentation processes in the development of traditional fermented foods (e.g., dairy, cereal, vegetable, and meat-based products).
4. Study traditional processing equipment, tools, and indigenous technologies used in food preparation and preservation.

Course Outcomes:

1. Describe the science behind traditional preservation techniques such as fermentation, drying, salting, smoking, and pickling.
2. Identify the role of indigenous microorganisms in traditional fermentation processes and their contribution to product development.
3. Analyze the nutritional, sensory, and safety attributes of traditionally processed foods.
4. Assess the socio-cultural, economic, and regional importance of traditional foods and indigenous food practices.

Curriculum Details: (There shall be FOUR Modules in each course)

Module No.	Unit No.	Topic	Hrs. Required to cover the contents
1.0		Introduction and basis	8 hrs.
	1.1	History: nomadic vs. settled food practices, origins of drying, fermenting, and salting	
	1.2	Spoilage agents: bacteria, molds, yeasts, enzymes, oxidation, physical damage	
	1.3	Water activity (aw) and its link to microbial growth	
	1.4	pH and acidity as preservation tools	
2.0		Thermal Processing	8 hrs.
	2.1	Heat transfer principles in cooking and processing	
	2.2	Canning: acidified versus low-acid foods, botulism risk	
	2.3	Pasteurization (HTST vs. LTLT) versus sterilization	
	2.4	Blanching: enzyme inactivation before drying or freezing	
3.0		Drying and Freezing	8 hrs.
	3.1	Sun drying (fruits, fish, grains), smoke drying (meats), air drying, Rehydration and texture changes	
	3.2	Rate of drying: temperature, humidity, airflow, Nutrient loss (vitamin C, thiamine) versus nutrient concentration	
	3.3	Root cellars, ice houses, evaporative cooling (e.g., zeer pots), Effect of cold on enzymatic and microbial activity	
	3.4	Limitations of traditional cold storage	
4.0		Fermentation	8 hrs.
	4.1	Lactic acid fermentation: yogurt, sauerkraut, kimchi, idli/dosa batter Alcoholic fermentation: bread, wine, traditional brews, Acetic acid fermentation: vinegar	
	4.2	Starter cultures versus spontaneous fermentation	
	4.3	Safety: distinguishing beneficial versus pathogenic microbial activity	
	4.4	Salting, Curing and Pickling	
		Total	33 hrs

Course Structure: Open Elective -Teaching Scheme

SFSCET-1301A: Techniques in Food Analysis

Curriculum Details

Course Code	Course Name (Paper Title)	Teaching Scheme (Hrs.)		Credits Assigned		
		Theory	Practical	Theory	Practical	Total
SFSCCT-1303	Techniques in Food Analysis	32	48	02	02	04

Assessment Scheme

Course Code (2)	Course Name (3)	Theory				Practical		Total [Col (6+7) or Col (8+9)] (10)
		CA			ESA (7)			
		Test I (4)	Test II (5)	Avg of T1 & T2 (6)				
SFSCCT-1303	Techniques in Food Analysis	20	20	20	30	20	30	100

Course Pre-requisite:

1. Basic knowledge of chemistry and biochemistry are required to learn this subject.

Course Objectives:

1. To understand nature and concept of food analysis
2. To provide knowledge about chromatography, spectrophotometer.
3. To learn Immuno assay techniques in food analysis.
4. Apply knowledge to select best analytical method
5. Understand and explain different analytical method.

Course Outcomes:

After successful completion of this course students will be able to understand rules and regulation of food analysis, principles and methodology of analytical techniques and methods of sensory analysis of food.

Curriculum Details: (There shall be FOUR Modules in each course)

Module No.	Unit No.	Topic	Hrs. Required to cover the contents
1.0		Nature and concepts of food analysis	8 hrs.
	1.1	Rules and regulations of food analysis	
	1.2	Functions of quality control departments and quality control Laboratories	
	1.3	Safety and precautions in laboratory. General safety, ventilation, equipment arrangement	
	1.4	Safety wares, first aid, handling and disposal of hazardous samples	
2.0		Principles and methodology involved in analytical techniques	8 hrs.
	2.1	Chromatography: Definition- Chromatography, Mobile phase, Stationary phase, partition coefficient, Rf value, retention time and chromatogram.	
	2.2	Principle and working of Gas chromatography (GC), High pressure liquid chromatography (HPLC), types of detectors used in GC and HPLC, Thin layer chromatography (TLC) chromatographic methods applied as quality control.	
	2.3	Separation techniques- Dialysis, electrophoresis, sedimentation ultra-filtration, ultra-centrifugation, Iso-electric focusing, isotopic techniques, monomeric	
	2.4	Near Infrared Spectroscopy (NIR), Nuclear Magnetic Resonance (NMR) and its application, Ultrasonic equipments, conductivity and resistivity meters.	
3.0		General Chemical Methods of Food Analysis	8 hrs.
	3.1	Analysis of Moisture and Total solids. Methods of Analysis, Protein separation and characterization.	
	3.2	Carbohydrate Analysis; Importance of Analysis, Methods of analysis for Monosaccharides, Oligosaccharides, Polysaccharides; Structural and nonstructural, dietary fiber	
	3.3	Fat Analysis; Importance of Fat Analysis, Methods of Analysis Fat characterization.	
	3.4	Analysis of Vitamins; Importance, Methods of Analysis. Analysis of Ash Importance; Analysis of minerals, importance.	
4.0		Principle and methodology involved in analysis and evaluation of analytical data	8 hrs.
	4.1	Rheological analysis, textural profile, Evaluation of data-accuracy and precision	
	4.2	Corelations regression, computers for data analysis and result Interpretation	
	4.3	Sensory analysis of food: Objective and Subjective method	
	4.4	Food Adulteration	
		Total	33 hrs

Reference Books:

1. Methods in Food Analysis. Joslyn, M.A. Ed 1970. Academic Press, New York.
2. Development in Food Analysis Techniques-1. Applied Science King, R.D. Ed. 1978 Publisher Ltd. London.
3. A Manual of Laboratory Techniques. Raghuramulu, N., Madhavan Nair, K., and Kalyanasundaram, S. Ed 1983. NationalInstitute of Nutrition, ICMR, Hyderabad.
4. Handbook of organic qualitative analysis, By Clarke. 5. Vogel’s text book of qualitative chemical analysis. (Longman) ELBS) Edn.

SFSCEP-1301A Lab. Course in Techniques in Food Analysis

Practical’s

Practical No.	Practical’s
1	Estimation of Moisture content in given food samples by hot air oven and reflux distillation method.
2	Estimation of Protein content of the given food sample by Kjeldhal method
3	Estimation of Crude fat content by using Soxhlet apparatus.
4	Estimation of ash content in given food sample.
5	Quantitative determination of sugars and fatty acid profile by GLC
6	Estimation of phytic acid trypsin inhibitor activity using spectrophotometer
7	Identification of fruit juice sugar using TLC
8	Analysis of heavy metal using atomic absorption spectrophotometer
9	Demonstration of working of HPLC and GC.
10	Determination of sugar content by Lane and Eynon method.
11	Study of determination of rheological characteristics of food sol / gel and sensory evaluation of foods.

Course Structure: Open Elective -Teaching Scheme

SFSCET-1301B: Food Hygiene and Microbial Standards

Curriculum Details

Course Code	Course Name (Paper Title)	Teaching Scheme (Hrs.)		Credits Assigned		
		Theory	Practical	Theory	Practical	Total
SFSCCT-1304	Food Hygiene and Microbial Standards	32	48	02	02	04

Assessment Scheme

Course Code (2)	Course Name (3)	Theory				Practical		Total [Col (6+7) or Col (8+9)] (10)
		CA			ESA (7)			
		Test I (4)	Test II (5)	Avg of T1 & T2 (6)		CA (8)	ESA (9)	
SFSCCT-1304	Food Hygiene and Microbial Standards	20	20	20	30	20	30	100

Course Pre-requisite:

Students should have the basic knowledge of hygiene and sanitation and microbiology

Course Objectives:

1. To understand importance of food hygiene and microbial standards.
2. To understand sanitization practices in food industries.
3. To learn effect of presence of toxins in food.

Course Outcomes:

Will prepare students to understand sanitizers, food toxins, common pest and its control. It will also help students to importance of personal hygiene in food industries.

Curriculum Details: (There shall be FOUR Modules in each course)

Module No.	Unit No.	Topic	Hrs. Required to cover the contents
1.0		Food Safety Principles	
	1.1	Food handling habits and personal hygiene	8 hrs.
	1.2	Types of soil	
	1.3	Soil properties	
	1.4	Food qualities	
2.0		Sanitizing Agents	
	2.1	Types of sanitizing agents and their properties	8 hrs.
	2.2	Physical sanitizing agent's example- Hot water, Steam and UV light. Acid and alkaline cleaners.	
	2.3	Chlorine, iodine and their compounds as sanitizers, Quaternary ammonium compounds, phenolic compounds as sanitizers.	
	2.4	Advantages and disadvantages of these sanitizers.	
3.0		Sanitation Facilities	
	3.1	Sanitation procedures in food plant operations	8 hrs.
	3.2	CIP system. Cleaning premises and surroundings.	
	3.3	Common Pests in food services rodents, insects, birds, house flies, cockroaches, ants and their control.	
	3.4	Hazards in food chain physical, chemical, biological	
4.0		Food Toxins	
	4.1	Naturally occurring, bacterial and fungal 5 Metals as toxins – sources, contamination, toxicity and elimination	8 hrs.
	4.2	Pesticide residues as toxin i) Chlorinated ii) Non – chlorinated.	
	4.3	Risk assessment and management in food preparation	
	4.4	Food laws and regulations	
		Total	34 Hrs

Reference Books:

1. Food Microbiology Adams and Moss Royal Society of Chemistry, 2015
2. The Safety of Foods Graham HD AVI Publishing 1968
3. Food Additive Toxicology Maga CRC Press, 1994
4. Food Safety Management: A Practical Guide for the Food Industry Yasmine and Huub Academic Press, 2013

SFSCEP-1301B Lab course in Food Hygiene and Microbial Standards

Practical's

Practical No.	Practical's
1	Microbial quality of air
2	Microbial load of palm/ fingers, nose secretions of workers TPC/ E.coli / Vibrio
3	Microbial quality of eating utensils
4	Investigation of organisms involved in infections, diseases vibrio typhoid.
5	Testing of sanitizers, disinfectants for antimicrobial activity
6	Methods of pest control in food industries rodents / cockroaches
7	Study of HACCP for food industries
8	Study of national and international microbial quality standards
9	Detection of Salmonella
10	Visit to District public health laboratory
11	Visit to food industry to study microbial safety

Course Structure: Vocational Course -Teaching Scheme

SFSCVC-1301: Processing of Vegan Foods

Curriculum Details

Course Code	Course Name (Paper Title)	Teaching Scheme (Hrs.)		Credits Assigned		
		Theory	Practical	Theory	Practical	Total
SFSCVC-1301	Processing of Vegan Food	00	48	00	30	50

Assessment Scheme

Course Code (2)	Course Name (3)	Theory				Practical		Total [Col (6+7) or Col (8+9)] (10)
		CA			ESA (7)			
		Test I (4)	Test II (5)	Avg of T1 & T2 (6)		CA (8)	ESA (9)	
SFSCVC-1301	Processing of Vegan Food	00	00	00	00	20	30	50

Course Pre-requisite:

Students should have the basic knowledge of vegan foods, food processing and quality.

Course Objectives:

- 1 To understand the principals of vegan food preparation
- 2 To develop skills in plant based product formulation.
3. To prepare nutritionally balanced vegan foods.

Course Outcomes:

Will be able to understand the processing of vegan food products.

SFSCVC-1301: Processing of Vegan Foods

Practical's

Practical No.	Practicals
1	Introduction to Vegan Foods
2	Preparation of plant based milk
3	Preparation of vegan curd or yogurt
4	Preparation of vegan Butter
5	Preparation of Vegan Cheese
6	Preparation of Vegan Bakery Products
7	Preparation of Vegan Snacks
8	Preparation of Vegan meat alternative
9	Preparation of Vegan Desserts
10	Nutritional analysis of Vegan Foods
11	Sensory Evaluation of Vegan Products
12	Preparation of Vegan Chocolate
13	Preparation of Vegan Beverages
14	Preparation of Vegan Roti
15	Preparation of Vegan Soup

Course Structure: Field Work -Teaching Scheme
Experimental Learning Programme
Curriculum Details

Course Code	Course Name (Paper Title)	Teaching Scheme (Hrs.)		Credits Assigned		
		Theory	Practical	Theory	Practical	Total
SFSFP1301	Experimental Learning Programme	00	48	00	04	04

Assessment Scheme

Course Code (2)	Course Name (3)	Theory				Practical		Total [Col (6+7) or Col (8+9)] (10)
		CA			ESA (7)			
		Test I (4)	Test II (5)	Avg of T1 & T2 (6)		CA (8)	ESA (9)	
SFSFP1301	Experimental Learning Programme	00	00	00	00	50	50	100

Experimental Learning Programme

Salient Features: - Syllabus helps students to develop production and marketing skills of new products.

Learning Objectives: -

1. To learn the various skills to start a small scale food processing unit
2. To understand the various aspects of small scale food processing unit

Out-come:

After successful completion of this course students will be able to understand production and

marketing skills.

Prerequisites: -

Student should have the basic knowledge of food processing, food quality, packaging and marketing. It is recommended that students should be develop a new product depending upon local needs and industrial demands.

Experimental Learning Programme:

1. Market Survey
2. Product Planning (Innovation & Creativity)
3. Product Trials
4. Formulation
5. Final Innovative Products
6. Product Costing
7. Preparation of 50 Kg Slot
8. Marketing
9. Documentation and Reports
10. Record Keeping for raw material
11. Financial records related to products
12. Preparation of Product Manual
13. Presentation of Project
14. Submission of Project report

Semester VI

Course Structure: Major 1 -Teaching Scheme
SFSCCT-1351: Extrusion Technology
(Major 1)
Curriculum Details

Course Code	Course Name (Paper Title)	Teaching Scheme (Hrs.)		Credits Assigned		
		Theory	Practical	Theory	Practical	Total
SFSCCT-1351	Extrusion Technology	32	48	02	02	04

Assessment Scheme

Course Code (2)	Course Name (3)	Theory				Practical		Total [Col (6+7) or Col (8+9)] (10)
		CA			ESA (7)			
		Test I (4)	Test II (5)	Avg. of T1 & T2 (6)		CA (8)	ESA (9)	
SFSCCT-1351	Extrusion Technology	20	20	20	30	20	30	100

Course Pre-requisite:

Student should have the basic knowledge of cereal and legume processing, food quality, bakery techniques.

Course Objectives:

1. To provide knowledge about extruded food products
2. To learn extrusion process in various foods

Course Outcomes:

After successful completion of this course students will be able for the production extruded food products

Curriculum Details: (There shall be FOUR Modules in each course)

Module No.	Unit No.	Topic	Hrs. Required to cover the contents
1.0		Extrusion	8 hrs.
	1.1	Definition, introduction to extruders, principles and types. Covered Uses of extruders in the food industry	
	1.2	Pre-conditioning of raw materials used in extrusion process	
	1.3	Chemical and nutritional changes in food during extrusion	
	1.4	Classification of breakfast cereals	
2.0		Uses of extruders in the food industry	8 hrs.
	2.1	Single screw extruder: principle of working, net flow, factors affecting extrusion process	
	2.2	Twin screw extruder: counter rotating and co-rotating twin screw extruder	
	2.3	Process characteristics of the twin screw extruder	
	2.4	Use of extruders in extrusion.	
3.0		Texturized vegetable protein:	8 hrs.
	3.1	Definition	
	3.2	processing techniques	
	3.3	Pre-conditioning of raw materials used in extrusion process	
	3.4	Chemical and nutritional changes in food during extrusion	
4.0		Raw materials and process	8 hrs.
	4.1	Quality testing of vermicelli and spaghetti	
	4.2	Quality testing of pasta and macroni products	
	4.3	Ready to eat breakfast cereals by extrusion cooking	
	4.4	Classification of breakfast cereals	
		Total	35 Hrs.

Reference Books:

1. Advances in Food Extrusion Technology Maskan and Altan CRC Press, 2000
2. Extrusion of Foods Harper JM CRC Press, 1981
3. Food Process Engineering and Technology Berk Z. Academic Press, 201

SFSCCP-1351 Lab Course in Extrusion Technology

Practicals

Practical No.	Practical
1.	Physical properties of extruded foods (expansion, density, water absorption index, etc.)
2.	Physicochemical properties of proteins
3.	Preparation of protein isolate and concentrate
4.	Preparation of noodles/ vermicelli
5.	Preparation of Spaghetti
6.	Preparation of weaning foods
7.	Studies on properties of texturized vegetable protein
8.	Determination of oil absorption capacity of extruded products
9.	Determination of water absorption capacity of noodles Effect of extrusion cooking on anti-nutritional factor 1 13 Visit to extrusion industry
10.	Cooking quality of TVP
11.	Studies on Textural Profile Analysis of extruded products

Course Structure: Major 2 -Teaching Scheme
SFSCCT-1352: Food Plant Design Layout (Major 2)
Curriculum Details

Course Code	Course Name (Paper Title)	Teaching Scheme (Hrs.)		Credits Assigned		
		Theory	Practical	Theory	Practical	Total
SFSCCT-135	Food Plant Design Layout	32	48	02	02	04

Assessment Scheme

Course Code (2)	Course Name (3)	Theory				Practical		Total [Col (6+7) or Col (8+9)] (10)
		CA			ESA (7)			
		Test I (4)	Test II (5)	Avg. of T1 & T2 (6)		CA (8)	ESA (9)	
SFSCCT-1352	Food Plant Design Layout	20	20	20	30	20	30	100

Course pre-requisite:

Students should have the basic knowledge of measurements, drawing, and climatic conditions.

Course Objectives:

1. To understand the designs and layout of various food processing industries

Course Outcomes:

Will be able to understand different parameters related designing and layout of various food plant

Curriculum Details: (There shall be FOUR Modules in each course)

Module No.	Unit No.	Topic	Hrs. Required to cover the contents
1.0		Overall design of an enterprise	8 hrs.
	1.1	Plant design, sales planning for plant design	
	1.2	Strength of material – engineering materials, material science	
	1.3	Use of various metals, including plastic, glass, etc in food Industry	
	1.4	selection and specification – material design, concepts and manufacturing of various equipments and machineries for food processing plant	
2.0		Plant Location, levels of Plant location. Location of Layout	8 hrs.
	2.1	location factors, plant site selection	
	2.2	Location Theory and models	
	2.3	. industrial buildings and grounds	
	2.4	Classification of dairy and food plants	
3.0		Preparation of a Plant Layout	8 hrs.
	3.1	Plant Layout problem, importance, objectives	
	3.2	Classical type of layout	
	3.3	Evaluation of plant layout	
	3.4	Advantages of good layout, organizing for plant layout, data forms	
4.0		Common problems in plant layout	8 hrs.
	4.1	Process scheduling siting of process sections	
	4.2	Equipment selection capacity	
	4.3	Determination, arrangement of process and service Equipment	
	4.4	Cleaning and sanitization, painting and color coding	
		Total	34 Hrs.

Reference Books:

- i. Milk Plant Layout H.S. Hall FAO Pub., Rome 1968
- ii. Plant Layout and Design James M. Moore Mac Millan, New York 1971
- iii. Textbook of Dairy Plant Layout and Design --- ICAR, New Delhi 2010

SFSCCP-1352 Lab Course in Food Plant Design Layout**Practical's**

Practical No.	Practical's
1.	Preparation of project report
2.	Preparation of feasibility report
3.	Layout of food storage warehouses
4.	Layout and design of cold storage
5.	Layout of preprocessing house
6.	Layout of milk and milk product plants
7.	Bakery and related product plant
8.	Fruit processing plants
9.	Vegetable processing plants
10.	Waste treatment and management of food plant

Course Structure: Major 3 -Teaching Scheme
SFSCCT-1353: Food Quality, Safety Standards And
Certification (Major 2)
Curriculum Details

Course Code	Course Name (Paper Title)	Teaching Scheme (Hrs.)		Credits Assigned		
		Theory	Practical	Theory	Practical	Total
SFSCCT-1353	Food Quality, Safety Standards And Certification	32	00	03	00	03

Assessment Scheme

Course Code (2)	Course Name (3)	Theory				Practical		Total [Col (6+7) or Col (8+9)] (10)
		CA			ESA (7)			
		Test I (4)	Test II (5)	Avg. of T1 & T2 (6)		CA (8)	ESA (9)	
SFSCCT-1353	Food Quality, Safety Standards And Certification	20	20	20	30	00	00	50

Course pre-requisite: Basic knowledge of Food Science/Food Technology fundamentals (composition, processing principles). Elementary knowledge of Statistics (useful for sensory data analysis, quality control charts). Basic exposure to Food Industry operations (helpful but not always mandatory)

Course Objectives:

1. Understand the concept, definition, and attributes of food quality, including physical parameters such as color, gloss, viscosity, and consistency, and identify common food defects.
2. Gain knowledge of sensory evaluation principles, including taste, flavour, and other sensory perceptions, along with the psychological and physiological factors that influence sensory judgment.
3. Understand the principles and application of Total Quality Management (TQM) in the food industry.
4. Develop knowledge of quality and safety management systems including ISO standards (ISO 9000, ISO 22000) and HACCP, and their implementation, documentation, and auditing procedures.
5. Familiarize students with national and international certification and accreditation bodies (FSSAI, Codex Alimentarius, USDA, FDA, IFS) and their role in safeguarding food quality and safety.
6. Introduce good practices in the food industry — GAP, GMP, GLP, and GHP — and their role in ensuring food quality and safety.
7. Enable students to apply quality assurance and food safety principles in real-world food processing and manufacturing environments.

Course Outcomes:

1. Students are able to understand food quality, Color and gloss, Role of viscosity and consistency and Defects

in food quality.

2. Student will get to know about the Flavour, Taste, Odour, and sensory measurements.
3. Students will learn the Laboratory quality measurement, Classification of difference tests, Consumer measurement
4. Students are able to understand Quality of raw materials, Quality of products during processing and after processing, Factors influencing the food quality.
5. Students will learn the ISO system- ISO: 9000 certification, HACCP, Plan documentation and types of records; auditing, Certification and International bodies.

Curriculum Details: (There shall be FOUR Modules in each course)

Module No.	Unit No.	Topic	Hrs. Required to cover the contents
1.0		Introduction to food quality	8 hrs.
	1.1	Food quality: definition and role in food industry; quality attributes and classification	
	1.2	Color and gloss: definition, different colors, color measurement by spectrophotometer, Munsell color system and Lovibond tintometer; role in food quality	
	1.3	Role of viscosity and consistency in food quality	
	1.4	Defects, classification, genetic – physiological defects: structural, off color, character; entomological defects- holes, scars, lesions, off coloring, curled aves and pathological defects	
2.0		Food quality evaluation and sensory analysis	8 hrs.
	2.1	Flavour: definition and its role in food quality, taste: classification, taste qualities, relative intensity, reaction time, effect of disease, temperature, and taste medium on taste, basic tastes and interaction of tastes	
	2.2	Visual, auditory, tactile, oral perception other than taste and other senses	
	2.3	Factors influencing sensory measurements: attitudinal factors, motivation, psychological errors in judgment, relation between stimulus and perception adaptation. Correlation of sensory and instrumental analysis	
	2.4	Odour: definition, classification, neutral-mechanisms, olfactory abnormalities, odor testing, techniques, thresholds, odor intensities and olfaction	
3.0		Quality management System	8 hrs.
	3.1	Total Quality Management: Objectives, principles, implementation; Deming's 14 points on TQM, Benefits of TQM, Quality Tools, Quality Circle	
	3.2	Classification of difference tests, two – sample tests, three-sample tests, multisampling tests, comparison of procedures, ranking and scoring	
	3.3	Hedonic scaling, dilution procedures, descriptive sensory analysis, contour method and other procedures	

	3.4	Consumer measurement: factors influencing acceptance and preference, objectives of consumer preference studies and information obtained from consumer study	
4.0		Quality certification and accreditation systems	
	4.1	ISO system- ISO: 9000 certification series, ISO: 22000-2005 – role and benefits	8 hrs.
	4.2	HACCP: principles, implementation and maintenance of records plan documentation and types of records; auditing: surveillance, audit, mock audit, third party quality certifying audit, auditors and lead auditors	
	4.3	Certification, certification procedures, certifying bodies, accrediting bodies – FSSAI, list of quality accreditation bodies and criteria of accreditation in India. International bodies- Codex Alimentarius Commission, USDA, FDA and IFS- role in safeguarding quality	
	4.4	Good agricultural practices (GAP), good manufacturing practices (GMP), good laboratory practices (GLP) and good hygiene practices (GHP).Factors influencing food quality	
		Total	34 Hrs.

Reference Books:

1. Inteaz Alli. 2004. Food Quality Assurance: Principles and Practices. CRC Press, Boca Raton, FL, USA.
2. Ronald H. Schmidt and Gary E. Rodrick. 2003. Food Safety Handbook. John Wiley & Sons, Inc., Hoboken. New Jersey, USA.
3. R. E. Hester and R. M. Harrison. 2001. Food Safety and Food Quality. Royal Society of Chemistry, Cambridge, UK.

Course Structure: Open elective -Teaching Scheme**SFSCET-1351A: New Product Development****Curriculum Details**

Course Code	Course Name (Paper Title)	Teaching Scheme (Hrs.)		Credits Assigned		
		Theory	Practical	Theory	Practical	Total
SFSCET-1351	New Product and Development	32	48	02	02	04

Assessment Scheme

Course Code (2)	Course Name (3)	Theory				Practical		Total [Col (6+7) or Col (8+9)] (10)
		CA			ESA (7)			
		Test I (4)	Test II (5)	Avg. of T1 & T2 (6)				
SFSCET-1351	New Product and Development	20	20	20	30	20	30	100

Course Pre-requisite:

Scientific and technical understanding of food production is requiring to learn this subject.

Course Objectives:

1. To supervise the students in developing and producing a well packaged food product of good chemical, microbiological and sensory qualities with good and stable shelf life.
2. To understand and be able to make appropriate packaging, labeling designs, pricing and marketing of developed food products
3. To learn about latest trends and techniques in food science.

Course Outcomes:

1. To understand why new product are developed

2. To appreciate why product may be fail.
3. To understand the importance of product branding and marketing
4. To develop a novel food products of good chemical, microbiological and sensory qualities.

Curriculum Details: (There shall be FOUR Modules in each Course)

Module No.	Unit No.	Topic	Hrs. Required to cover the Contents
1.0		Introduction to the Product development and formulation	8 hrs.
	1.1	Need for Product development. New food product ,Definition - General characteristics of New food product.;	
	1.2	Classes of new Food products Line extensions Repositioning of existing products	
	1.3	New form of existing product , Reformulation ,New packaging - Innovative products and Creative products and Value added products	
	1.4	Difference between Market and Market places; Customers and Consumers	
2.0		Managing Product Development and Understanding Customer Needs	8 hrs
	2.1	Idea generation, Tools for brainstorming	
	2.2	Idea screening, Concept development and testing	
	2.3	Business Models for New Products, Managing Product Development	
	2.4	Customer need analysis and factor analysis, Identifying New Product Opportunities, Market Research for New Product Development .	
3.0		Organizing Product Development	8 hrs
	3.1	Shelf-life testing, kitchen scale development of the food product.	
	3.2	Selection of suitable packaging, Cost estimation, Food packaging and labeling regulations.	
	3.3	New Product Strategy: Network effects and standards Building Markets and Creating Demand for New Products, Intellectual Property Issues in Product Development	
	3.4	New Product Business Plans – Strategy Consulting for New Products, Go-to-market plans Disruptive innovation and the innovator’s dilemma.	
4.0		Design Thinking for New Products and Market Testing	8 hrs
	4.1	Product specifications, Designing Products for Emerging Markets, Design of packaging material.	
	4.2	Market testing - methods of testing	
	4.3	Evaluation Quality assessment of new developed products Costing/pricing and economic evaluation of the product	
	4.4	Product launch and commercialization of the product	

		Total	32 hrs
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Reference Books:

1. Ulrich, K. and Eppinger, S.; Product Design and Development; McGraw Hill; ISBN: 978-0- 07- 802906-6.
2. Drew Boyd & Jacob Goldenberg (2013) Inside the Box: The Creative Method that Works for Everyone, Joseph V. Sinfield, Edward Calder, Bernard McConnell and Steve Colson (2012) How to Identify New Business Models, MIT Sloan Management Review Vol. 53, No.2.
3. Chun-Che Huang (2000) Overview of Modular Product Development, Proc. National Science Council ROC(A) Vol. 24, No. 3, pp. 149-165
4. Marc H. Meyer and Arthur DeTore (1999) Product Development for Services, The Academy of Management Executive, Vol. 13, No. 3, Themes: Teams and New Product Development (Aug., 1999), pp. 64-76

SFSCEP-1351A Lab Course in New Product Development

Practicals

Practical No.	Practical's
1.	Market survey of existing various products
2.	Formulation of new products based on corporate decision /needbased 1 Protein-energy rich 2 Low calorie (fat replacer) 3 Low sodium content 4 Glycemic index based 5 Cholestrolemic index based 6 Phyto-chemical based
3.	Product development based on above formulation depending on local sources/ Technology
4.	Quality assessment
5.	New product development for i) Infant / weaning foods ii) Geriatric iii)Physiological status iv) Athletes
6.	Product Selection and concept development
7.	Standardization of Process

8.	Sensory Evaluation of new product
9.	Nutritional Evaluation

Course Structure: Open Elective -Teaching Scheme

SFSCET-1351B FOOD BIOTECHNOLOGY

Curriculum Details

Course Code	Course Name (Paper Title)	Teaching Scheme (Hrs.)		Credits Assigned		
		Theory	Practical	Theory	Practical	Total
SFSCET-1351	Food Biotechnology	32	48	02	02	04

Assessment Scheme

Course Code (2)	Course Name (3)	Theory				Practical		Total [Col (6+7) or Col (8+9)] (10)
		CA			ESA (7)			
		Test I (4)	Test II (5)	Avg. of T1 & T2 (6)		CA (8)	ESA (9)	
SFSCET-1351	Food Biotechnology	20	20	20	30	20	30	100

Course Pre-requisite:

Technical understanding of microbiology fermentation techniques is require to learn this project.

Course Objectives:

1. To understand the role of biotechnology in food processing and preservation.
2. To provide knowledge about techniques used in plant, animal and microbial technology.
3. To introduce students to new developments in the field of food biotechnology.

Course Outcomes:

Will prepare students to understand biotechnological techniques for food production. It will also help students to learn the application in industries.

Curriculum Details: (There shall be FOUR Modules in each course)

ModuleNo.	UnitNo.	Topic	Hrs. Required to cover the contents
1.0		Genetic Material	8 hrs
	1.1	Chemical nature of genetic material	
	1.2	Properties and functions of genetic material	
	1.3	Organization of the genetic material in bacteria, eukaryotes and Viruses	
	1.4	Application of biotechnology in food	
2.0		Transcription and translation	8 hrs
	2.1	RNA synthesis, types of RNA,	
	2.2	Genetic code; Mutation and DNA repair	
	2.3	Types of plasmids, genetic recombination in bacteria	
	2.4	Transformation, transduction, conjugation, regulation of gene expression in prokaryotes	
3.0		Recombinant DNA technology:	8 hrs
	3.1	Restriction enzymes, cloning vectors, cloning procedure, cloning of specific gene	
	3.2	Identification of specific gene	
	3.3	C-DNA technology	
	3.4	Identification and selection of cells containing cloned genes	
4.0		Immobilization of enzymes	8 hrs
	4.1	Arresting of cell in insoluble matrix, immobilized cell systems,	
	4.2	Cell attachment in a surface, aggregation, entrapment, containment, physical adsorption	
	4.3	Covalent bonding, cross linking, entrapment into polymeric films,	
	4.4	Uses and applications in industries	
		Total	33 Hrs

Reference Books:

1. Biotechnology and Food Processing Mechanics Meenakshi Paul Gene-Tech Books, New Delhi 2007
2. Molecular Biology of the Gene James D. Watson 7th Ed. Benjamin Cummings, San Francisco, USA. 2013.

SFSCEP-1351B Lab Course in Food Biotechnology

Practical's

Practical No.	Practical's
1.	Chemical mutagenesis using chemical mutagens (Ethidium bromide)
2.	Determination of survival curves using physical and chemical mutagens
3.	. Production of biomass and enzymes from fruits and vegetable waste
4.	Isolation and analysis of chromosomal/genomic DNA from E. coli and Bacillus cereus
5.	Separation of protoplast using cellulytic enzymes
6.	Production of biomass from fruit and vegetable waste
7.	Introduction of ELISA/Southern blot/DNA finger printing, etc
8.	Agarose gel electrophoresis of plasmid DNA
9.	Pesticide degradation by pseudomonas species

Course Structure: Skill Based -Teaching Scheme

SFSCSC-1351: Fermented Foods Technology –Teaching Scheme Curriculum Details

Course Code	Course Name (Paper Title)	Teaching Scheme (Hrs.)		Credits Assigned		
		Theory	Practical	Theory	Practical	Total
SFSCSC-1351	Processing of Fermented Foods	00	48	00	02	02

Assessment Scheme

Course Code (2)	Course Name (3)	Theory				Practical		Total [Col (6+7) or Col (8+9)] (10)
		CA			ESA (7)			
		Test I (4)	Test II (5)	Avg. of T1 & T2 (6)		CA (8)	ESA (9)	
SFSCSC-1351	Processing of Fermented Foods	-	-	-	-	20	30	50

Course Pre-requisite:

Students should have the basic knowledge of fermentation, food processing and food quality

Course Objectives:

1. To understand Principles of food fermentation.

2. To study Microorganisms used in food fermentation.
3. To prepare traditional and industrial fermented foods.
4. To evaluate quality and safety of fermented products.

Course Outcomes:

Will be able to understand processing fermented food products.

SFSCSC-1351 Lab Course in Processing of Fermented Foods

Practical No.	Practical
1	Introduction to fermentation
2	Preparation of Curd (Lactic acid Fermentation)
3	Preparation of fermented batter (Idali or Dosa)
4	Preparation of Sauerkraut
5	Preparation of Kimchi
6	Preparation of fermented beverages.
7	Preparation of Fermented Soya Products
8	Preparation of Vinegar
9	Preparation of Fermented bakery Product (Bread)
10	Microbial Examination of fermented foods
11	Sensory Evaluation of Fermented Foods

Course Structure: PROJECT WORK -Teaching Scheme

SFSCFP-1351-MICRO PROJECT WORK Technology –Teaching Scheme Curriculum Details

Course Code	Course Name (Paper Title)	Teaching Scheme (Hrs.)		Credits Assigned		
		Theory	Practical	Theory	Practical	Total
SFSCFP-1351	Micro project work	00	48	00	04	04

Assessment Scheme

Course Code (2)	Course Name (3)	Theory				Practical		Total [Col (6+7) or Col (8+9)] (10)
		CA			ESA (7)			
		Test I (4)	Test II (5)	Avg. of T1 & T2 (6)		CA (8)	ESA (9)	
SFSCFP-1351	Micro project work	-	-	-	-	50	50	100

MICRO PROJECT WORK

General Information

Student Project aims to motivate/encourage and to provide opportunity to the Under Graduate Students of Agricultural Universities to take up challenges in identification and/or in solution of the problem of the surrounding society related to Agricultural and Allied Sciences and work for better utilization of resources. The participant students shall be able to carry out a project on a

topic in relation to a problem of the region. The project should be innovative and activity based, so that the students may develop their ability to solve a societal problem experienced locally using their skill and knowledge. The project will help in creative thinking, observation, ability to raise pertinent questions and predicting solution. This also helps the students how to make field work, to write a scientific report and to present the work.

A Good Project should have:

- i) Originality, Innovation and creativity and should commensurate with understanding the problem and finding solution.
- ii) Relevance of the project to the community and impact of the project on society.
- iii) Proper understanding of the subject, quality and quantity of the work and efforts to validate the data collected.

Food Technology is a dynamic field which require continuous research and innovation in product. With this intention Research Project is included in course curriculum to promote the students towards research and innovation in the field. Research Project should be allotted to students based on their/Guide's interest towards the ELP project. The Research Project is not supposed to be a formal dissertation, rather it should be objective based to make minor changes in existing products or product innovation based on consumer demand and market needs. Formal Training should be given to students to make them acquaint with basic research skills and writing skills. During Research Project, student shall learn to collect the necessary research data and facts related to product and process and plan the product trials accordingly. During Research Project, student shall learn to collect the necessary research data and facts related to product and process and plan the product trials accordingly.

Research Project should be correlated with the ELP products which students are supposed to make during the student READY – Experiential learning Programme (I & II).

Project Report

The structure of the project report shall be in the format is as follows:

- i) **The Cover Page** - It should have
 - Title of the project
 - Name and address of Group Leader and team members
 - Name and address of Supervisor/Guide teacher
- ii) **Abstract - 500 words**
- iii) **Contents**
- iv) **Introduction-** Description on background of the study
- v) **Aims and Objectives**
- vi) **Relevance of the project work**
- vii) **Methodology**
- viii) **Observations:** This shall include the observations during the experiment.

Observation can be both qualitative as well as quantitative.

- ix) **Data analysis and interpretation:** The data generated/ obtained from the experiments/observations should be processed for better understanding in a more structured manner. Tools and methods (e.g. statistical methods) may be used for analysing data to understand the patterns that emerges from it to form results and conclusions.
- x) **Results:** Results are the output of compilation of the data into meaningful outcomes/ interpretations and sometimes, there is a need to redo the experiments to get consistent results. In case it is not possible to “repeat the experiments”, there should be adequate replicates so that adequate data is available for interpretation, and arriving at results.
- xi) **Conclusions:** This is the logical end of the project to arrive at specific conclusions from the observed phenomena. In a way, the whole objective of the project is to arrive at some conclusion, either positive or negative which would lead to a better understanding of the problem.
- xii) **Acknowledgement**
- xiii) **References**