Programme Structure

Sharda School of Bio-Science & Technology

Department of Food Science and Technology

Master of Technology

(Food Technology)

Programme Code: SBT0103

Batch: 2026-2028

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Section 1: Background

History

The Department of Food Technology was founded in 2009 with a vision to make an impact through research and technology-based training. The department has teaching and research programmes that encompass various basic and applied aspects of modern Food Technology . The department is successfully running Undergraduate (B.Tech), Postgraduate (M.Tech), and Ph.D. Programme. The scheme of courses has been designed keeping in the demand trend in mind. A conscious effort has been made so that the curriculum of each programme integrates courses of biological sciences and engineering with relevant laboratory programmes and a compulsory research project of variable duration.

Objective of Department

The main objective of the Department is to provide academic training and conduct research in the interdisciplinary areas of Food Technology with particular emphasis on extending the knowledge generated from these studies towards the development of technologies of commercial significance.

All the basic infrastructural facilities needed for conducting teaching and research programmes in different areas of Food Technology have been developed in the department. The department is housed in a newly constructed building consisting of classrooms with audio-visual facilities well-equipped Research laboratories, a special lab for Molecular Biology, Genetic Engineering, Plant Tissue Culture, Microbial technology, NanoFood Technology , and Bioinformatics. The students undergo project training in modern Food Technology viz Bioinformatics, Genomics, Neurobiology, Nano Food Technology , Water Management, Cancer Biology, Stem Cell and Regenerative Medicine, Plant and Animal Food Technology , etc.

About the programme: (M. Tech Food Technology)

M. Tech in Food Technology is a 2-year Programme that equips students with knowledge and skills that enable them to embrace a professional research career in the life sciences and Food Technology industry. MTech in Food Technology from Sharda University instils applied competencies amongst students that are essential to be a professional engineer. The curriculum covers a breadth of concepts and imparts hands-on training to students to enhance their industry-relevant technical skills.

- The Programme imparts lessons on nutritional value, biochemistry properties, and chemicals in different foods and packed food items. The Programme aims at gaining in-depth knowledge regarding various traits of Food Technology and its specializations. The students will gain knowledge about the science of the safe production of nourishing food items from advanced raw materials. The classroom lectures, seminars, and term papers are followed by extensive exposure to latest food techniques and methods through dissertation and research projects.

The scope of Food Technology is undoubtedly at boom as the technological advancements in the field have improved the sustainability of human life. Sharda University has developed the infrastructure and provides necessary facilities to impart Food Technology education and training

in a conducive environment. Our M Tech Food Technology Programme paves the way for students to develop their knowledge and skills, and effectively apply them at their workplace.

How is the M.Tech (Food Technology) Course Beneficial?

This degree course enables the students to go for further research work in the respective subjects.

They have many job options in the food, medical and the agricultural sector, and the research and development departments of the government and private sectors.

M.Tech (Food Technology) Employment Areas

- Agricultural Sector
- Academic Institutions
- Food Processing Industries
- Nutraceutical and Functional food
- Research and Development Departments

M.Tech (Food Technology) Job Types

- Food Safety Officer
- Food Scientist
- Assistant Professor / Student Welfare Officer
- Food Analys
- Central Food Safety Officer
- Quality Assurance Engineer
- R&D Coordinator / Executive
- Senior Scientific Assistant

Eligibility Criteria

For National Students

B. Tech. in Food Technology , Life Sciences, Biotechnology, Biomedical Engg. B.Pharma with minimum 60% marks.

M.Sc. in Food Technology, Biotechnology Agriculture Genetics Molecular Biology Physiology Life Sciences (Botany Zoology Biochemistry Microbiology Medicinal Chemistry) with minimum 60% marks. GATE/NET qualified students shall be preferred.

For International Students

The eligibility criterion for all programmes for international applicants is minimum 50% in the qualifying examination and having studied the pre-requisite subjects for admission in to the desired programme.

Availability of Academic Calendar for M.Tech (Food Technology)

https://www.sharda.ac.in/attachments/common_files/Academic_Calendar_2022-23_for_First_Year_SSET,_SSBSR,_SSDAP,_SSMFE,_SSBS,_SSOL,_SSHSS,_SOE,_SOP,_SSAS,_SSAHS_(Semester_Pattern).pdf

Standard Structure of the programme at University Level

Vision, Mission and Core Values of the University

Vision of the University

To serve the society by being a Global University of higher learning in pursuit of academic excellence, innovation and nurturing entrepreneurship.

Mission of the University

1. Transformative educational experience
2. Enrichment by educational initiatives that encourage global outlook
3. Develop research, support disruptive innovations and accelerate entrepreneurship
4. Seeking beyond boundaries

Creative Campaign Can be TEDs: This is guiding principle for promotion and wide circulation among various stakeholder.
Guidelines: Similar Mnemonics can be designed by schools.

Core Values

Integrity
Leadership
Diversity
Community

Note: Detailed Mission Statements of University can be used for developing Mission Statements of Schools/ Departments.

Vision and Mission of the School

Vision of the School

To become a global centre for higher learning in pursuit of academic excellence, innovation, and entrepreneurship in various disciplines of Bioscience and Technology, Biosciences aim to create innovative solutions in various agriculture, medical, and industrial frontiers. Establish progressive growth in the national and international scientific scenario.

Mission of the School

M1: To adapt and update students with rapidly changing technologies through self-improvement with continuous learning and professional ethics.

M2: To enable students for community-collaborative learning processes beyond classrooms in various disciplines of biotechnology.

M3: To conduct cutting-edge multi-disciplinary research in plant, animal, medical, industrial, microbial, and environmental biotechnology.

M4: To motivate and train students for industrial practices, higher studies, lifelong learning skills, and entrepreneurship

Vision and Mission of the Department

Vision of the Department

To emerge as a globally recognized centre of excellence in Food Science and Technology through quality education, innovative industrial research, and entrepreneurial development for ensuring food safety, security, and sustainability.

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Mission of the Department

M1: To provide strong foundational and advanced knowledge in food science and technology across undergraduate, postgraduate, and doctoral programs through continuous learning and professional ethics.

M2: To promote experiential, interdisciplinary, and community-engaged learning to address challenges in food safety, nutrition, and public health.

M3: To conduct high-quality, cutting-edge translational research and promote its commercialization in the areas of food processing, preservation, quality assurance, functional foods, and emerging technologies at undergraduate, postgraduate, and doctoral levels.

M4: To develop skilled professionals, entrepreneurs and researchers equipped for industry, academia, and entrepreneurship through industrial collaboration, innovation, and lifelong

M5: To foster leadership, critical thinking, and innovation among students through Intellectual Property Rights (IPR), enabling them to contribute to sustainable food systems and global food security learning.

Section 2: programme Educational Objectives and Outcomes

Programme Educational Objectives (PEO)

The Educational Objectives of PG programme in Food Technology are:

PEO1: Postgraduates will be able to integrate the food sciences with engineering principles for the study of food safety and quality management systems.

PEO2: Postgraduates will demonstrate the applications of food engineering principles through the development of industrial designs and processes that are of societal and industrial importance.

PEO3: Postgraduates will update their knowledge and skill set with recent discoveries through self-improvement, research experience and continuous learning to create engineering solutions for society and the environment.

PEO4: Postgraduates will develop communication skills and demonstrate independent thinking, analytical and problem-solving skills, self-management and function effectively in team-oriented and open-ended activities in an industrial or academic environment.

PEO5: Postgraduates will develop leadership skills at levels appropriate to their experience and perform ethically and professionally in business, academia, industry and society.

Map PEOs with School Mission Statements:

PEO Statements	School Mission 1	School Mission 2	School Mission 3	School Mission 4
PEO1:	3	3	2	1
PEO2:	2	2	3	1
PEO3:	3	2	3	1
PEO4:	1	1	2	3
PEO5:	2	2	1	3

Correlation levels 1, 2, or 3 as defined below:

1. **Slight (Low) 2. Moderate (Medium) 3. Substantial (High)**

Map PEOs with Department Mission Statements:

PEO Statements	Department Mission 1	Department Mission 2	Department Mission 3	Department Mission 4
PEO1:	3	3	2	1
PEO2:	2	3	1	3
PEO3:	1	2	3	3
PEO4:	1	3	3	2
PEO5:	2	3	3	1

Enter correlation levels 1, 2, or 3 as defined below:

1. **Slight (Low) 2. Moderate (Medium) 3. Substantial (High)**

Programme Outcomes (PO's)

PO1: Engineering knowledge: Apply the knowledge of engineering fundamentals, biological and physical sciences to the solution of complex engineering problems.

PO2: Problem analysis: Identify and analyze complex engineering problems, formulate research solutions and reach substantiated conclusions using principles of basic and applied sciences and related technologies.

PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems: Use research based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and bioinformatics tools including prediction and modelling to study complex biological systems with an understanding of the limitations.

PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Lifelong learning: Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

PSO1: Evaluate food preservation and processing techniques to identify, and characterize critical

hazards for industrial applications.

PSO2: Develop the interdisciplinary approach towards identification and mitigation of hunger as well as food borne diseases management.

PSO3: Implement knowledge and research abilities in cereal processing, meat processing, dairy processing, food engineering, food safety and quality assurance.

Mapping of Programme Outcome vs. Programme Educational Objectives

Mapping	PEO1	PEO2	PEO3	PEO4	PEO5
PO1	3	3	2	1	1
PO2	3	1	1		
PO3	1	3	2	1	1
PO4	3	2	1	1	
PO5	3	3	2	1	
PO6	1	1	2	2	3
PO7	1	2	3		
PO8				1	3
PO9				3	2
PO10				3	2
PO11	2	3	1	2	3
PO12	2	1	3	1	2
PSO1	3	3	3	2	2
PSO2	3	3	3	2	2
PSO3	3	3	3	2	2

1. Slight (Low) ***2. Moderate (Medium)*** ***3. Substantial (High)***

Programme Outcome Vs Courses Mapping Table:
Course Articulation Matrix

Semester-I																
Programme Outcome →	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
	Food Storage and Plant Layout Design	3	2	1	2	3	3	1	1				2	2	1	2	3
	New product development	3	2	2	3	2	3	3	1				1	1	1	2	3
	Advanced Food Chemistry	3	2	1	3	1	1		1		1		2	3	3	1	2
	Food Fermentation and Biotechnology	3	2	2	3	1	1	1	1				2	2	1	3	3
	Transport Phenomenon in Food Processing	1	2	3	2	3	2	2	2	1		2	2	3	2	2	2
	Fermentation Technology Lab	3	2	2	3	3	1	1	1		1		2	3	3	1	2
	New Product Development Lab	3	2	2	3	3	3	3	1				1	1	1	2	3
Semester-II																	
Programme Outcome →											PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4

Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9							
	Advanced Dairy Technology	3	2	2	1	1	1				2	2	1	2	2	1	1
	Advanced Food Packaging Technolog	2	1	2	3	3	1	1					1	1	1	3	3
	Processing of Fruits Vegetables and Spices	1	3	1	2	3		2	1	2	1	1	3	3	3	2	1
	Processing Technology of Cereals, Pulses and Oilseeds	3	2	3	1	2	1			1	2	3	2	2	1	2	2
	Food Quality and Safety Regulations	2	3	2		1	2	3	2		1	2	1	1	2	1	3
	Advanced Food Packaging Lab	2	1	2	3	3	1	1	1	2	2	1	1	1	2	3	3
	Cereals, Legumes and Oilseeds Processing Lab	3	2	1	3	2		2		1	1	2	2	3	2	2	2
	Dairy Technology Lab	1	2	1	2	3	1	1	2	2	1	1	3	3	3	2	1

	Food Biotechnology Lab	3	2	2	3	2	1		1	1	2	1	1	2	2	1	2
	Community Connect		1	1			3	3	3	3	3	2	2	1	1	2	3
	Research Methodology	1	3	2	3	2	1		1	1	2	3	3	2	2	3	2
Semester-III																	
	Seminar																
	Dissertation-1	3	3	2	3	2	1			2	3	3	3	2	1	3	3
Semester-IV																	
	Dissertation-II	3	3	2	3	2	1			2	3	3	3	2	1	3	3

Section 3: Curriculum

The components of the curriculum

Course Component	Curriculum Content (% of total number of credits of the programme)	Total number of contact hours	Total number of credits
Basic Sciences	18.75%	14	14
Engineering Sciences	81.25%	19	19
Technical and communications skills	18.75%	10	6
programme Core	62.5%	10	10
programme Electives	37.5%	23	23
Project(s)	12.5%	52	26

Programme Structure - M. Tech. in Food Technology

I. Programme Details

Programme Name :M. Tech. Food Technology
Programme Code : SBT0103
Programme level : PG
Programme Duration : Two years
Minimum Credits for Programme :
Maximum Credits for Programme : 72

Programme Structure with Semester-wise Credit distribution
Proposed Batch: 2026-2028

Sr. No	Course Code	Course Name	Category	L	T	P	Credits
Semester I							
1.	FPTXXXX	Food Storage and Plant Layout Design		3	1	0	4
2.	FPT602	New Product Development		3	0	0	3
3.	FPTXXXX	Programme Elective-1 (Advanced Food Chemistry)		3	0	0	3
4.	FPTXXXX	Programme Elective-2 (Food Fermentation and Biotechnology)		3	0	0	3
5.	FPT607	Programme Elective-3(Transport phenomenon in food processing)		3	1	0	4
6.	FPP657	Fermentation Technology Lab		0	0	2	1
7.	FPP652	New Product Development Lab		0	0	4	2
	Semester I Credits: Min : 20 Max: 20						
Semester II							
1.	FPT611	Advanced Dairy Technology		3	1	0	4
2.	FPT606	Programme Elective-4 (Advanced Food Packaging Technology)		3	0	3	3

3.	FPT612	Programme Elective-5 (Advances in Food Biotechnology)		3	0	0	3
4.	FPT609	Programme Elective-6 (Processing technology of cereals pulses and oilseeds)		3	0	0	3
5.	FPT605	Programme Elective-7 (Food Plant design)		3	0	0	3
6.	FPP653	Advanced Food Packaging Lab		0	0	2	1
7.	FPP654	Food Biotechnology Lab		0	0	2	1
8.	FPP655	Cereals, Legumes and Oilseeds Processing Lab		0	0	2	1
9.	FPP656	Dairy Technology Lab		0	0	2	1
10.	CCU101	Community Connect		0	0	4	2
11.	MRM001	Research Methodology (NPTEL)		2	0	0	2
	Semester II		**Credits:**	**Min: 24**	**Max: 24**		
Semester III							
1.	FPP618	Seminar		0	0	4	2
2.	FPP620	Dissertation-1		0	0	20	10
	Semester III		**Credits:**	**Min: 12**	**Max: 12**		
Semester IV							
1.	FPP621	Dissertation-II		0	0	32	16
	Semester V			**Credits:**	**Min: 16**	**Max: 16**	
Programme Credits: Min: 72 Max: 72							

Section 4: Syllabus

FPTXXX: Food Storage and Plant Layout Design

1	Course number	**FPT**	
2	Course Title	**Food Storage and Plant Layout Design**	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
5	Course Objective	The course is designed to give an understanding of the following: 1. Impart knowledge to the students about food processing and various unit operations involved in packaging, storing and preservation. 2. Develop an understanding of related hazards and safety, and transportation.	
6	Course Outcomes	After completion of the course, students will be able to: CO1: Identify the various causes of food deterioration and food poisoning. CO2: Assess product quality and the effect of processing technique on it. CO3: Acknowledge plant location design for a food plant and conduct the design of the product and process CO4: Evaluate and assess the design of utilities and hygiene in the plant. CO5: Obtain an in-depth understanding of project costs and associated laws. CO6: Combining the fundamentals of storage and plant layout guidelines and applying them to real-time processes.	
7	Outline syllabus: CO Mapping		
	Unit 1	**Storage of Foods and Storage Design**	CO1 and CO6
	A	Purpose, Problems, Protection, Preservation Techniques	
	B	Traditional methods of storages	
	C	Design considerations, Warehouse design and Bin design	
	Unit 2	**Storage of perishable foods and precooling**	CO2 and CO6
	A	Principle of cooling, Methods of pre-cooling, Storage of intermediate moisture foods	
	B	Design of MA & CA storage	
	C	Design of Cold storage and freezer	
	Unit 3	**Food Plant Location and Product Design**	CO3 and CO6

	A	General Design parameter, Planning feasibility study, location/site selection			
	B	Primary and secondary factors, Process flow design			
	C	Product specifications, Description of Processes			
	Unit 4	**Design of utilities and hygiene**			CO4 and CO6
	A	Utilities design-different food sectors			
	B	Waste treatment			
	C	Hygiene design			
	Unit 5	**Project cost and laws**			CO5 and CO6
	A	DPR(Detailed Project Report), Cost analysis			
	B	International laws			
	C	National Rules and regulation			
8	Course Evaluation				
	Mode of examination	Theory/viva			
	Weightage Distribution	CA	MTE	ETE	
		25%	25%	50%	
9	References 1. Raoult-Wack, A. L., Rios, G., Saurel, R., Giroux, F., & Guilbert, S. (1994). Modeling of dewatering and impregnation soaking process (osmotic dehydration). Food Research International, 27(2), 207-209.				
9.1	Textbook	1. George Saravacos Athanasios E. Kostaropoulos.2016. Hand book of food processing Equipments. 2. Springer Cham Heidelberg New York Dordrecht London. 3. Zeuthen, P., & Bøgh-Sørensen, L. (Eds.). (2003). Food preservation techniques. Elsevier. 4. Desrosier, N. W., & Desrosier, J. N. (1977). The technology of food preservation (No. Ed. 4). AVI Publishing Company, Inc.			

COURSE ARTICULATION MATRIX

COs	PO 1	PO 2	PO 3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3			1					3			3	3	1	2
CO2	3			1					3			3	3	1	3
CO3	3	3	3	2	3				2			3	3	3	2
CO4	3	3	3	2	3						1	3	3	3	2
CO5	3		3	1		2	2		3			3		3	1
CO6	3	3	3	3	3	3	1		3		1	3	3	3	3

FPT602: New Product Development

School: SSBT		**Batch: 2026-2028**	
Programme: M. Tech.		**Current Academic Year: 2026-2027**	
Branch: FPT		**Semester: 01**	
1	Course Code	**FPT602**	
2	Course Title	**New Product Development**	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	**Compulsory**	
5	Course Objective	The course is designed to give an understanding of the following: 1. Gain an understanding of the processes involved in the invention process, formulation, and development of new food products. 2. Develop an appreciation of the food industry and how innovation is critical to the industry. 3. Cultivate basic food science principles to problem solve during product development.	
6	Course Outcomes	After completion of the course students will be able to: CO1: Analyze to produce food prototypes or food concepts. CO2: Compare and distinguish effective product development communication materials and Planning of trails. CO3: Interpret the use of statistical methods like ANOVA, RSS and SPSS in new Product development. CO4: Exploitating formulations to meet cost targets, ingredient statement, nutrition profile and Sensory attributes of desired product. CO5: Discuss and enhance team cooperation and communication skills. CO6: Combining the knowledge acquired from previous academic courses and apply it to the real life project of developing a new food product.	
7	Course Description	This course is designed to provide students with a basic understanding of the product development process in the commercial food industry. Through lectures, and hands-on formulation activities, students will learn how to successfully initiate, organize, and carry out a product development project.	
8		Outline syllabus	CO Mapping
	Unit 1	**Introduction of New Product Development**	CO1, CO6
	A	Definition and importance of New Product Development	
	B	Steps of Product Development and product life cycle	
	C	Product development tools and reasons for failure.	
	Unit 2	**Development process for trails**	CO2, CO6

	A	Development of process and planning for production trials. Planning the test market. Actual production trials and test marketing.	
	B	Evaluation of test results. Launching of the product.	
	C	Advertising and marketing plans. Suggestions for improving success.	
	Unit 3	**Statistical methods in Food Product Development**	CO3 and CO6
	A	Design of experiment, Introduction to Consumer Survey (sensory analysis), market Survey.	
	B	Development of New Product by Using Statistical Software likes Design Matrix, Full.	
	C	Factorial Design, RSM, SPSS, One way ANOVA and Two ways ANOVA.	
	Unit 4	**Market Survey**	CO4 and CO6
	A	Market and literature survey to identify the concepts of new products based on special dietary requirements, functionality, convenience and improvisation of existing traditional Indian foods.	
	B	Screening of product concept on the basis of techno-economic feasibility.	
	C	Development of prototype products and Standardization of formulation process.	
	Unit 5	**Case Studies**	CO5 and CO6
	A	Proximate Analysis of New Product	
	B	Packaging, labelling and shelf-life studies	
	C	Cost analysis and Final Project Report Each team/group of students would develop a food product on the basis of above-mentioned lines /steps and would submit a project report.	
	Mode of examination	Theory/viva	
	Weightage Distribution	CA: 25% / MTE: 25% / ETE: 50%	
	Text book/s*	1. Fuller, Gordon W, New Product Development From Concept to Marketplace, CRC Press,2004	

	Other References	2. Anil Kumar, S., Poornima, S.C., Abraham, M.K.& Jayashree, K.2004. Entrepreneurship Development. New Age International Publishers. 3. Moskowitz, Howard and Saguy ,R. I. Sam 2009. An Integrated Approach to New Food Product, CRC Press.	

COURSE ARTICULATION MATRIX

COs	PO 1	PO 2	PO 3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3			1					3			3	3	1	2
CO2	3			1					3			3	3	1	3
CO3	3	3	3	2	3				2			2	3		2
CO4	3	3	3	2	3						1	2	3		2
CO5	3		3	1		2	2		3			3	3	1	3
CO6	3	3	3	3	3	3	1		3		1	2	3	1	2

FPT603 Advanced Food Chemistry

School: SSBT		**Batch: 2026-2028**
Programme: M. Tech.		**Current Academic Year: 2026-2027**
Branch: FPT		**Semester: 01**
1	Course Code	**FPT603**
2	Course Title	**Advanced Food Chemistry**
3	Credits	3
4	Contact Hours (L-T-P)	3-0-0
	Course Status	**Elective**
5	Course Objective	1. To acquire knowledge of principle and techniques involved in food chemistry. 2. To comprehend the basic strategies of food chemistry and how it can be applied for human benefit. 3. To learn proximate analysis of carbohydrates, lipids, fats and minerals.
		After successfully completion of this course students will be able to: CO1: Demonstrate depth and breadth of knowledge in food chemistry by demonstrating knowledge of, and applying, the principles and concepts of chemistry as they apply to food systems. CO2: Analyze the techniques used in proximate analysis of foods and effect of antioxidants as ingredients in food formulations and the related factors that might be controlled during to enhance product quality. CO3: Describe the role of food flavours and additives in food industry. CO4: Discuss metabolic pathways. CO5: Develop an understanding behind the principles and role of alkaloids, flavanoids. CO6: Investigate the role of food chemistry in food processing.
	Course Description	The course will deal with the chemistry of the principal components of foods, their properties and interactions, and the changes that occur during processing, storage, and utilization. Emphasis will be on evidence derived from original research literature, interpretation of research findings, and problem solving based on the scientific principles of food biochemistry.
8	Outline syllabus	CO Mapping

	Unit 1	**Carbohydrates, Proteins and Lipids**	CO1, CO6
	A	Food Carbohydrates: structural, analytical, physicochemical, nutritional and functional aspects of small mol. wt. carbohydrates and polysaccharides of plant and microbial origin.	
	B	Proteins: Sources and physico-chemical and functional properties; Purification of proteins, changes in proteins during processing.	
	C	Milliard browning reaction, Lipids: classification, and use of lipids in foods. Water relationships in foods: water activity and its relevance to deteriorative processes in foods (chemical, enzymatic, physical and microbial changes).	
	Unit 2	**Antioxidants**	CO2, CO6
	A	Antioxidants: chemistry and mechanisms of action, techniques of evaluation of antioxidant activity, uses.	
	B	Interactions among food components and their	
	B	Interactions among food components and their	
		effect on sensory, nutritional and processing quality, Natural antioxidants, mechanisms of action and their evaluation techniques,	
	C	**Proximate analysis of foods**	
	Unit 3	**Flavors and additives**	CO3 and CO6
	A	Fragrance and flavouring compounds: essential oils, terpenoids- oleoresins.	
	B	Pigments in food and their industrial applications,	
	C	Interactions among food flavours and packaging materials, Interactions among food additives and their significance in food processing.	
	Unit 4	**Metabolic Pathways and Enzymes**	CO4 and CO6
	A	Glycolysis and TCA cycle	
	B	Meat tenderization-process parameters and enzymes linked	

	C	Methods to enhance tenderization, Flatulence causing sugars.			
	Unit 5	**Alkaloids and Flavanoids**			
	A	Chemistry of Alkaloids, Flavonoids and other Phenolics.			
	B	Glycemic index and its role in human nutrition,			
	C	Appetite Suppressants			
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		25%	25%	50%	
	Text book/s*	1. Advances in Food and Nutrition Research. Elsevier Book Series. 2. Aurand LW, Woods A & Wells MR. 1987. *Food Composition and Analysis*. AVI Publ. 3. Birch GG & Lindley MG.1986. *Interactions of Food Components*. 4. Fennema. Ed. 1976. Principles of Food Science: Part I Food Chemistry. Marcel Dekker, New York. 5. Potter, N.N. 1978. Food Science. 3rd Ed. AVI, Westport.			
	Other References	Baynes JW, Monnier VM, Ames JM & Suzanne R. 2005. *The Maillard Reaction: Chemistryat the Interface of Nutrition, Aging, and Disease Thorpe*. Annals of the New York Academyof Science.			

COURSE ARTICULATION MATRIX

COs	PO 1	PO 2	PO 3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PS O1	PS O2	PS O3
CO1	3			3			3			2		3	3	1	
CO2	2			2			1					1	3	1	3
CO3	2	1			3		1			1		1	2		2
CO4	3	3	3	2	3						1			3	3
CO5	3		3	1		2	2		3			3	3	1	3
CO6	3	2	2		3	3	1		3		1	2	3	1	3

FPTXXX Processing of Fruits, Vegetables and Spices

School: SSBT		**Batch : 2026-2028**	
Program: M.Tech		**Current Academic Year: 2026-2027**	
Branch: FPT			
1	Course Code	FPT	
2	Course Title	Processing of Fruits, Vegetables and Spices	
3	Credits	3	
4	Contact Hours (L-T-P)	(3-0-0)	
	Course Status	**Elective**	
5	Course Objective	The objective of this subject is to introduce students to the science and technology associated with fruits and vegetables and their transformation into food products and ingredients.	
6	Course Outcomes	After completion of the course students will be able to: CO1: Assess the structure and composition of fruits and vegetables and their role in nutrition. CO2: Classify preservation and processing technologies applied to fruits and vegetables. CO3: Analyse the physiological changes occurring to fruit and vegetables during harvesting and storage CO4: Discuss appropriate technological process for plantation crops, from the selection of raw materials to final product. Discuss and describe the processing conditions of major and minor spices CO5: Describe the scope of legal standards in spices CO6: Elaborate on the impact of certain technological operations and parameters on the success of fruit, vegetable and spice processing and on certain properties of the final product.	
7	Course Description		
8	Outline syllabus		CO Mapping
	Unit 1		CO1, CO6
	A	Importance of fruits and vegetable ,history and need of preservation; Method of preservation	
	B	Canning and bottling of fruits and vegetables ; process of canning; factors affecting the process- time and temperature; lacquering syrups and brines for canning	
	C	Spoilage in canned foods, containers of packing.	
	Unit 2	**Processing of fruits and related products**	CO2, CO6
	A	Processing of fruit juices (selection, juice extraction, deaeration, straining, filtration and clarification), Preservation of fruit juices.	

	B	Jam: Constituents, selection of fruits, processing & technology. Jelly, Constituents (Role of pectin ratio), Theory of jelly formation, Processing & technology, Defects in jelly.	
	C	Marmalade: Types, processing and defects. Processing of squashes, cordials, nectars, concentrates and powder. Rules and norms	
	Unit 3	**Processing of Vegetables**	CO3 and CO6
	A	Pickles: Types, Processing, Spoilage	
	B	Processing of chutneys and sauces. tomato puree, paste, ketchup, sauce and soup, standards and laws	
	C	Processing by drying: Sun drying, Mechanical dehydration Types, Working and Construction of equipment	
	Unit 4	**Introduction and processing of spices**	CO4 and CO6
	A	Introduction, Production and processing scenario of spice, flavour and its scope. Effect of processing on spice quality, contamination of spices with micro-organisms and insects	
	B	Major and minor spices processing - Processed products of spices: Ginger, chilli, turmeric, onion and garlic, pepper, cardamom.	
	C	Minor spices: Herbs, leaves and Spartan seasonings and their processing and utilisation. Allspice, Anise seed, sweet basil; Caraway seed, cassia, cinnamon, clove, coriander, cumin, dill seed; Fennel seed, nutmeg, mace, mint, marjoram. Rosemary, saffron, sage; Savoury, thyme, ajowan; Asafetida, curry leaves	
	Unit 5	**Legal standards for spices**	CO5 and CO6
	A	Standard specification of spices; Standards like ESA, ASTA, FSSAI and maintenance of quality by fumigation, CAS and ETO sterilization	
	B	Functional packaging of spices and spice products	
	C	By-products of plantation crops and spices	
	Mode of examination	Theory	
	Weightage Distribution	CA: 25% / MTE: 25% / ETE: 50%	
	Text book/s*	1. 1.Girdharilal, Siddappaa, G.S and Tandon, G.L., Preservation of fruits & Vegetables, ICAR, New Delhi, 1998. 2. 2. W.B Crusess. Commercial Unit and Vegetable Products, W.V. Special Indian Edition, Pub: Agrobios India.	

		3. 3. Manay, S. & Shadaksharaswami, M., Foods: Facts and Principles, New Age Publishers, 2004 4. Kadar, A. A. 1992. Postharvest Technology of Horticultural Crops. 2nd Ed. University of California. 4. 5.	
	Other References	1.Arsdel W.B., Copley, M.J. and Morgen, A.I. 1973. Food Dehydration, 2nd Edn. (2 vol. Set). AVI, Westport.	

COURSE ARTICULATION MATRIX

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
FPE.1	1	2	2	-	-	1	-	-	2	1	-	2	3	2	2
FPE.2	1	2	2	-	-	-	-	-	2	1	-	2	3	2	2
FPE.3	1	3	2	-	-	1	-	-	2	1	-	2	2	3	3
FPE.4	1	2	2	-	-	-	-	-	2	1	-	2	3	3	2
FPE.5	1	2	3	-	-	2	-	-	2	1	-	2	3	3	3
FPE.6	1	2	2	-	-	-	-	-	2	1	-	2	3	3	3

FPTXXX: Food Quality, Safety, and Regulations

School: SSBT		**Batch: 2026-28**	
Program: M. Tech		**Current Academic Year: 2026-27**	
Branch: FPT			
1	Course Code	FPT	
2	Course Title	Food Quality, Safety, and Regulation	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Elective	
5	Course Objective	This course will enable the students to identify different quality and safety parameters for evaluation and applications in food quality	
6	Course Outcomes	After the successful completion of this course, students will be able to: CO1: Comprehend the basic concept of food quality and sensory assessment and the requirements necessary for its application. CO2: Develop an idea for the appropriate methodologies and types of techniques for food quality evaluation purposes. CO3. Illustrate application of chromatographic techniques in food quality analysis. CO4: Outline the importance of national and international laws governing food production, import and export. CO5: Understand the role of food safety management systems in effective quality control and assurance. CO6: Explain the applications of sensory, analytical and food safety management systems in food processing and trade.	
7	Course Description	The '**Food Quality Safety and regulations'**course is designed to provide knowledge and skills in the applications, principles and practices of the analysis of foods for purposes of trade, compliance, quality assurance, authentication, complaint investigation, nutritional attributes and scientific research.	
8	Outline syllabus		CO Mapping
	Unit 1	**Introduction to quality and sensory evaluation techniques**	CO1, CO6
	A	Quality attributes of food, Gustation: Mechanism of taste perception, Quality assurance in the supply chain	
	B	Panel selection and panel training, sensory scores and data analysis, Difference tests for sensory evaluation	

	C	Olfaction, Colour: CIE (International Commission on Illumination) colour system; Image Processing Techniques For Food Quality Evaluation; Texture.			
	Unit 2	**Traditional and Modern Analytical Techniques**			CO2, CO6
	A	Spectroscopic techniques using UV/Vis, fluorescence, IR, FTIR, NIR, NMR, atomic absorption			
	B	ICP, polarimetry, refractometry,			
	C	Microscopic techniques in food analysis (light microscopy, SEM, TEM, XRD).			
	Unit 3	**Chromatography and Separation techniques**			CO3, CO6
	A	Adsorption, column, partition, affinity, ion exchange chromatography			
	B	Gas Chromatography, Gas Liquid Chromatography, HPLC types and detectors and application of chromatography for quality control.			
	C	Ultrafiltration, Solid phase extraction, Supercritical fluid extraction			
	Unit 4	**Food regulatory agencies and laws**			
	A	Food Safety standards and regulation: Introduction; Food Safety Standards Authority of India; BIS, Ministry of Consumer Affairs			CO4, CO6
	B	Codex Alimentarius, United States Food and Drug Administration, European Union norms, and FSANZ.			
	C	Food laws and standards, APEDA			
	Unit 5	**Food Safety Management Systems**			**CO5, CO6**
	A	Quality management systems, Good manufacturing practices, Good hygienic practices, Good Agricultural Practices, Good Laboratory practices, Safe quality food.			
	B	ISO 22000; Hazard analysis critical control points (HACCP)			
	C	Halal certification, Halal requirements.			
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		30%	20%	50%	
	Text book/s*	1.Kirk RS & Sawyer R. 1991. Pearson's Chemical Analysis of Foods. 9th Ed. Longman Scientific & Technical. 2.Leo ML. 2004. Handbook of Food Analysis. 2nd Ed. Vols. I-III. 3.Early R.Guide to Quality Management Systems for Food Industries. Blackie Academic. 4.Amerine MA, Pangborn RM &Rosslos EB. Principles of Sensory Evaluation of Food. Academic Press.			

	Other References	5. Linden G. 1996. Analytical Techniques for Foods and Agricultural Products. VCH. 6. Macleod AJ. 1973. Instrumental Methods of Food Analysis. Elek Sci. Marcel Dekker. 7.Nielsen S. (Eds.). 1994. Introduction to Chemical Analysis of Foods. Jones & Bartle

COURSE ARTICULATION MATRIX

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
FPT608.1	3	3	-	2	-	2	-	-	2	3	-	3	2	2	3
FPT608.2	3	-	-	1	-	-	-	-	2	-	-	2	3	2	2
FPT608.3	3	2	3	2	3	-	-	-	2	-	-	3	3	1	2
FPT608.4	3	3	2	3	3	-	-	-	3	2	1	2	2	-	2
FPT608.5	3	-	3	1	-	2	2	-	3	-	-	3	3	1	3
FPT608.6	3	3	3	3	3	3	1	-	3	-	1	3	3	2	2

FPTXXXX: Nutraceuticals, Functional Foods and Additives

School: SSBT		**Batch: 2026-28**	
Program: M. Tech		**Current Academic Year: 2026-27**	
Branch: FPT			
1	Course Code	FPT	
2	Course Title	Nutraceuticals, Functional Foods and Additives	
3	Credits	4	
4	Contact Hours (L-T-P)	3-0-0	
	Course Status	Elective	
5	Course Objective	This course has been designed to make student understand thehealth benefits of functional foods and nutraceuticals. It also highlights different type of food additives, classification and uses.	
6	Course Outcomes	After the successful completion of this course students will be able to: CO1: Understand the scope, status and importance of functional foods, nutraceuticals and food additives CO2: Acquire advance knowledge on various biomolecules showing health benefits CO3: Gain the advance knowledge on various physiological and biochemical aspects of life threatening and chronic diseases CO4: Explore the process of isolation, characterization and application of biomolecules. CO5: Obtain in depth knowledge about food additives, their types and permissible limits. CO6: Apply knowledge in use biomolecules exhibiting nutraceutical and functional food in alleviating different chronic disease.	
7	Course Description	The '**Nutraceuticals, Functional Foods and Additives'** course includes the details ofclassification, characterization, of various food bioactive components showing health benefits and highlights the different categories of food additives.	
8	Outline syllabus		CO Mapping
	Unit 1	**Introduction to Nutraceuticals and Functional Foods**	CO1, CO6
	A	Status and scope of health and functional foods in India, Definition and classification of nutraceuticals	
	B	Nutraceutical compounds and their classification based on chemical and biochemical nature with suitable and relevant descriptions.	
	C	Nutraceutical and functional food applications and their health benefits.	

	Unit 2	**Nutraceuticals and Functional Foods**			CO2, CO6
	A	Concept, types, development of functional foods			
	B	Functional foods and nutraceuticals and as anti-cancer, hypo-lipidemic, anti-stress, osteoarthritis, hypotensive, hypoglycemic, hypoallergenic food, neuro-protective food.			
	C	Antioxidants and other phytochemicals as anti-aging, Dietary fibers and complex carbohydrates from oats, wheat bran, rice bran as functional food.			
	Unit 3	**Functional foods for health and fitness**			CO3, CO6
	A	Whey proteins, soya proteins as nutraceuticals			
	B	Probiotic and prebiotic and their functional role.			
	C	Coffee and tea as functional foods/drinks and their protective effects.			
	Unit 4	**Processing of Bioactive molecules**			
	A	Nonthermal extraction of bioactive compounds			CO4, CO6
	B	Processing of health and functional foods			
	C	Encapsulation of bioactive compounds			
	Unit 5	**Food additives**			**CO5, CO6**
	A	Definitions, classification and functions of food additives			
	B	Chemistry of food additives, their application and functions in food formulations			
	C	Toxicological aspects of some food additives			
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		25%	25%	50%	
	Text book/s*	1.Robert E.C. Wildman, Richard S. Bruno, 2019. Handbook of Nutraceuticals and Functional Foods 2.W. Jeffrey Hurst. 2008. Methods of Analysis for Functional Foods and Nutraceuticals			
	Other References	3. S.N. Mohindru. 2008. Food Additives (Vol I & II)			

COURSE ARTICULATION MATRIX

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
FPT613.1	3	3	-	2	-	2	-	-	2	3	-	3	2	2	3
FPT613.2	3	-	-	1	-	-	-	-	2	-	-	2	3	2	2
FPT613.3	3	2	3	2	3	-	-	-	2	-	-	3	3	1	2
FPT613.4	3	3	2	3	3	-	-	-	3	2	1	2	2	-	2
FPT613.5	3	-	3	1	-	2	2	-	3	-	-	3	3	1	3
FPT613.6	3	3	3	3	3	3	1	-	3	-	1	3	3	2	2

FPTXXX: Novel techniques for food processing and evaluation

School: SET		**Batch: 2026-28**	
Program: M. Tech		**Current Academic Year: 2026-27**	
Branch: FPT		**Semester: 2**	
1	Course Code	FPTXXX	
2	Course Title	Novel techniques for food processing and evaluation	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Status	Elective	
5	Course Objective	This course has been designed to make student understand the different thermal and non-thermal techniques involved in the processing of food products.	
6	Course Outcomes	After the successful completion of this course students will be able to: CO1: Understand the scope, status and importance of thermal and non-thermal processing of foods and different quality changes CO2: Acquire advance knowledge of thermal processing of foods CO3: Gain the advance knowledge on Pulsed electric field, HPP and hurdle technology CO4: Explore the process of Irradiation, Cold plasma and pulsed light and their food application CO5: Obtain in depth knowledge about novelty in thermal processing techniques for foods CO6: Apply knowledge of thermal and non-thermal processing for the production of new foods	
7	Course Description	The '**Thermal and Non-Thermal Techniques for Foods'** course includes the details of the working principle, mechanism and applications of Thermal and non-thermal techniques like Pulsed electric field, HPP, hurdle technology, irradiation, and Cold plasma.	
8	Outline syllabus		CO Mapping
	Unit 1	**Introduction**	CO1, CO6
	A	Need and current status of Thermal and Non-Thermal Techniques for foods	
	B	Thermal Processing Techniques	
	C	Non-Thermal Processing Techniques	
	Unit 2	**Thermal Techniques**	CO2, CO6
	A	Drying, Dehydration and different type of dryers	
	B	Pasteurization: HTST, LTLT and UHT	
	C	Blanching and Sterilization	

	Unit 3	**Non-Thermal Techniques**			CO3, CO6
	A	Pulsed electric field: General principle, mechanism and application in foods			
	B	High pressure processing: General principle, mechanism and application in foods			
	C	Hurdle Technology: General principle, mechanism and application in foods			
	Unit 4	**Novel-Non-Thermal Techniques**			
	A	Irradiation: Operating principle, mechanism and application in foods			CO4, CO6
	B	Cold Plasma: Operating principle, mechanism and application in foods			
	C	Pulsed Light: Operating principle, mechanism and application in foods			
	Unit 5	**Novel thermal processing Techniques**			**CO5, CO6**
	A	Application of UV and Infrared for food processing			
	B	Microwave Processing			
	C	Ohmic heating and Radio Frequency			
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		25%	25%	50%	
	Text book/s*	1. S. D. Holdsworth and Ricardo Simpson, 2008, Thermal Processing Of Packaged Foods. 2. O. P. Chauhan, 2019, Non-thermal Processing of Foods 3. Howard Zhang, Gustavo V. Barbosa-Cánovas, V.M. Balasubramaniam, C. Patrick Dunne, Daniel Farkas, James Yuan, 2010, Nonthermal Processing Technologies for Food			
	Other References	4. Gary Tucker, Susan Featherstone, 2010, Essentials of Thermal Processing			

COURSE ARTICULATION MATRIX

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
FPT611.1	3	3	-	2	-	2	-	-	2	3	-	3	2	2	3
FPT611.2	3	-	-	1	-	-	-	-	2	-	-	2	3	2	2
FPT611.3	3	2	3	2	3	-	-	-	2	-	-	3	3	1	2
FPT611.4	3	3	2	3	3	-	-	-	3	2	1	2	2	-	2
FPT611.5	3	-	3	1	-	2	2	-	3	-	-	3	3	1	3
FPT611.6	3	3	3	3	3	3	1	-	3	-	1	3	3	2	2

FPT607 Transport Phenomena in Food Processing

School: SSBT		**Batch: 2026-2028**	
Programme: M. Tech.		**Current Academic Year: 2026-2027**	
Branch: FPT		**Semester: 01**	
1	Course number	**FPT607**	
2	Course Title	**Transport Phenomena in Food Processing**	
3	Credits	4	
4	Contact Hours (L-T-P)	4-1-0	
5	Course Objective	The course is designed to give an understanding of the following: 1. Deal with flow problems involving Newtonian and non-Newtonian fluids, solid-state heat conduction, forced & free convection, binary diffusion 2. Highlight coupling between three transport phenomena with applications in various disciplines in engineering & science.	
6	Course Outcomes	After completion of the course students will be able to: CO1: Identify and understand about various transport processes. CO2: Analyze and perform heat, mass and momentum transfer. CO3: Determine industrial problems along with appropriate boundary conditions. CO4: Design and develop steady and time-dependent solutions along with their limitations. CO5: Solve real-life problems involving transport of momentum, energy and mass in biological, mechanical and chemical and food systems using a unified approach. CO6: Combining the fundamentals of transport phenomena and apply them to real-time processes.	
7	Outline syllabus: CO Mapping		
	Unit 1	**Fundamental Concepts**	CO1 and CO6
	A	Fundamental of Mass Transport	
	B	Heat Transfer in Food Products	
	C	Momentum Transfer	
	Unit 2	**Mass Transfer in Foods**	CO2 and CO6
	A	Osmatic Dehydration of fruits	
	B	High Hydrostatic pressure	
	C	Ultrasonic	
	Unit 3	**Heat Transfer in Foods**	CO3 and CO6
	A	Cooking of meat	
	B	Thin layer drying of grain	
	C	Thermal processing	
	Unit 4	**Momentum transfer**	CO4 and CO6

	A	Drum drying			
	B	Fluidized bed drying			
	C	Extrusion mixing			
	Unit 5	**Simultaneous heat and Mass Transfer**			CO5 and CO6
	A	Deep fat frying			
	B	Microwave			
	C	Sterilization			
8	Evaluation				
	CA	Quiz/project/ and presentation			
	Weightage Distribution	CA	MTE	ETE	
		25%	25%	50%	

9	References 1. Cárcel, J. A., Benedito, J., Rosselló, C., & Mulet, A. (2007). Influence of ultrasound intensity on mass transfer in apple immersed in a sucrose solution. Journal of food engineering, 78(2), 472-479. 2. Thomson, W. J. (2000). Introduction to transport phenomena. 3. Datta, A. K. Transport Phenomena in Food Processing Engineering, (Himalaya Publishing House, 2001) 4. Rao, M.A. Rheology of Fluid and semisolid Foods: Principles and Applications, (Springer, 2007).	
9.1	Text book	1. Cárcel, J. A., Benedito, J., Rosselló, C., & Mulet, A. (2007). Influence of ultrasound intensity on mass transfer in apple immersed in a sucrose solution. Journal of food engineering, 78(2), 472-479. 2. Thomson, W. J. (2000). Introduction to transport phenomena.

COURSE ARTICULATION MATRIX

COs	PO 1	PO 2	PO 3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PS O1	PS O2	PS O3
CO1	3			3			3			2		3	3	1	
CO2	2			2			1					1	3	1	3
CO3	2	1			3		1			1		1	2		2
CO4	3	3	3	2	3						1			3	3
CO5	3		3	1		2	2		3			3	3	1	3
CO6	3	2	2		3	3	1		3		1	2	3	1	3

FPT606 Advanced Food Packaging Technology

School: SSBT		**Batch: 2026-2028**	
Programme: M. Tech.		**Current Academic Year: 2026-2027**	
Branch: FPT		**Semester:02**	
1	Course number	**FPT 606**	
2	Course Title	**Advanced Food Packaging Technology**	
3	Credits	4	
4	Contact Hours (L-T-P)	3-0-0	
5	Course Objective	To introduce students to the packaging of food products for safety and wholesomeness.	
6	Course Outcomes	By the end of this course students will be able to: CO1: Identify the materials based packaging CO2: Describe traceability through different packaging techniques. CO3: Determine the techniques for packaging of high moisture foods ar to enhance their shelf life. CO4: Understand convenience packaging CO5: Understand importance of labelling in degradable packaging CO6: Describe advanced packaging techniques of perishable and non-perishable food products	
7	Outline syllabus:		
	Unit 1	**Food packaging materials**	CO1, CO6
	A	Food packaging over the ages, Biopolymers	
	B	Antimicrobial	
	C	Water soluble	
	Unit 2	**Traceable Food packaging**	CO2, CO6
	A	Micro Packaging	
	B	Intelligent packaging	
	C	Smart packaging	
	Unit 3	**Packaging with modified atmosphere**	CO3, CO6
	A	MAP & CAP	
	B	Aseptic packaging	
	C	Active	
	Unit 4	**Convenience packaging**	CO4, CO6
	A	Shelf heating/cooling	
	B	Sustainable	
	C	Edible coating/film	
	Unit 5	**Degradable packaging**	CO5, CO6

	A	Biodegradable	
	B	Edible	
	C	Labelling and Food safety	
8	Course Evaluation		
8.1	Course work: 30% marks		
8.11	Attendance	None	
8.12	Homework	5 assignments,	
8.13	Quizzes	5 best quizzes : 15 marks Best of three	
8.14	Projects	one	
8.15	Presentations	one	
8.16	Any other	Assignment/Projects/Presentation- 10 Marks	
8.2	MTE	One, 25 marks	
8.3	End-term examination: 50 marks		
9	References 1. Fellows, P. J. (2022). Food processing technology: principles and practice. Woodhead publishing. 2. Han, J. H. (Ed.). (2005). Innovations in food packaging. Elsevier. 3. Ohlsson, T., & Bengtsson, N. (Eds.). (2002). Minimal processing technologies in the food industries. Elsevier.		
9.1	Text book 1. Fellows, P. J. (2022). Food processing technology: principles and practice. Woodhead publishing. 2. Han, J. H. (Ed.). (2005). Innovations in food packaging. Elsevier. 3. Ohlsson, T., & Bengtsson, N. (Eds.). (2002). Minimal processing technologies in the food industries. Elsevier.		
9.2	Other References		

COURSE ARTICULATION MATRIX

COs	PO 1	PO 2	PO 3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	-	3	-	-	-	-	-	2	-	-	2	3	3	3
CO2	-	-	-	-	-	-	-	-	2	-	-	2	2	2	2
CO3	2	-	-	-	-	2	-	2	3	-	2	2	3	2	-
CO4	2	2	2	3	-	-	2	2	3	2	-	2	3	2	2
CO5	-	-	3	3	2	2	2	-	3	2	-	3	-	-	2
CO6	2	2	2	-	2	2	-	2	3	-	2	2	3	-	2

FPT611: Advanced Dairy Technology

School: SSBT		**Batch: 2026-2028**	
Programme: M. Tech.		**Current Academic Year: 2026-2027**	
Branch: FPT		**Semester:02**	
1	Course Code	**FPT611**	
2	Course Title	Advanced Dairy Technology	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
5	Course Objective	This course has been designed to make student understand the different unit operations involved in the dairy industry for the production of various dairy-based products	
6	Course Outcomes	After the successful completion of this course, students will be able to: CO1: Discuss different physicochemical and thermal properties of milk and their applications. CO2: Analyze the knowledge for designing equipment and unit operations involved in the dairy processing plant. CO3: Inspect in-depth knowledge of concentrating milk and drying of the milk solids. CO4: Assess thermal and non-thermal processing of milk and quality changes. CO5: Examine advanced principles of processing and manufacturing dairy products. CO6: Apply knowledge in the production of different dairy products.	
7	Course Description	The '**Advanced Dairy Technology'** course outlines the characterization, processing steps, unit operations, and details of different equipment used for the production of dairy products	
8	Outline syllabus		CO Mapping
	Unit 1	**Introduction to Dairy Technology**	CO1, CO6
	A	Milk and Types of Milk, Factors affecting composition, quality, and yield of milk, Adulterations in milk and its detection.	
	B	Chemistry of milk, Physico-chemical properties of milk and milk products,	
	C	Chemical and microbial spoilage of milk and milk products	
	Unit 2	**Dairy processes and equipment**	CO2, CO6
	A	Designing and Development of milk processing equipment, Cream separation (standardization), Homogenization, Principle of homogenization, single and double-stage homogenizers	
	B	Pasteurization of Milk: batch, flash, and continuous pasteurizer, HTST pasteurizer and design principle and	

		thermal death kinetics, UHT processing of milk, quality changes during milk processing.			
	C	Agitation and mixing, construction of agitators, and patterns of flow.			
	Unit 3	**Concentration of milk and drying techniques**			CO3, CO6
	A	Evaporator, Food properties in relation to evaporator performance			
	B	Types of evaporators			
	C	Operations and various feeding systems, Economy of operation			
	Unit 4	**Spray drying and Drum Drying**			
	A	Theory of drying, estimation of drying rates and drying time			CO4, CO6
	B	Spray Dryer and Drum Dryer details and their operation			
	C	Atomization and feeding systems and separation and recovery of dried product			
	Unit 5	**Process technology for manufacture of Dairy products**			CO5, CO6
	A	Butter; ghee, Cheese, Weaning Foods, Casein and its derivatives			
	B	Condensed and evaporated milk, Frozen dairy products			
	C	Prebiotic, postbiotic, probiotic dairy products			
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		25%	25%	50%	
	Text book/s*	1. Su Kumar De, 2001. Outlines of Dairy Technology 2. Edgar Spreer, 1998, Milk and Dairy Product Technology			
	Other References	3.NIIR Board, 2013, Modern technology of milk processing & dairy products			

COURSE ARTICULATION MATRIX

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	-	2	-	2	-	-	2	3	-	3	2	2	3
CO2	3	-	-	1	-	-	-	-	2	-	-	2	3	2	2
CO3	3	2	3	2	3	-	-	-	2	-	-	3	3	1	2
CO4	3	3	2	3	3	-	-	-	3	2	1	2	2	-	2
CO5	3	-	3	1	-	2	2	-	3	-	-	3	3	1	3
CO6	3	3	3	3	3	3	1	-	3	-	1	3	3	2	2

FPP654: Food Biotechnology Lab

School: SSBT	**Batch: 2026-2028**
Programme: M. Tech.	**Current Academic Year: 2026-2027**
Branch: FPT	**Semester:02**

1	Course Code	FPP654
2	Course Title	Food Biotechnology Lab
3	Credits	1
4	Contact Hours (L-T-P)	0-0-2
	Course Status	Compulsory
5	Course Objective	This course has been designed to make students understand the role of biotechnology in food processing. The students will be able to analyze the presence of microorganisms in food, role of microbes and enzymes for improvement of foods.
6	Course Outcomes	After finishing the course the students will be able to CO1: Isolate and analyze microorganisms from food samples. CO2: Gain the knowledge lactic acid bacteria and produce lactic acid bacteria under submerged fermentation. CO3: Apply amylase enzyme in bakery products. CO4: Apply bakers yeast for bread making and demonstrate catalase activity in foods. CO5: Identify the role of microorganisms in fermented foods. CO6: Apply the knowledge of microbes, enzymes in food processing.

7	Course Description	The 'Food Biotechnology Lab' provides the knowledge about the microbial analysis of foods, role of enzymes in food processing and improvement in properties by fermentation.			
8	Outline syllabus				CO Mapping
	Unit 1	Isolation of molds from food samples			
		Determination of bacteria in given food samples by standard plate count method			CO1, CO6
	Unit 2	Isolation of lactic acid bacteria from curd samples			
		Lactic acid production using different carbon sources			CO2, CO6
	Unit 3	Isolation of amylase producing bacteria from food samples			
		To demonstrate the role amylase enzyme on dough volume			CO3, CO6
	Unit 4	To demonstrate the role of bakers' yeast in bread making			
		To demonstrate the catalase activity in sliced raw potato or ground meat.			CO4, CO6
	Unit 5	*To demonstrate the sauerkraut production by fermentation*			
		To perform microbial analysis of preserved beverage			CO5, CO6
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	CE	ETE	
		25%	25%	50%	

	Text book/s*	B. H. Lee, 2014 Fundamentals of Food Biotechnology, Wiley	
	Other References	G. Oralugbagbe, 2018 Food Technology Lab Manual	

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	2	23	1	1	-	-	2	-	-	2	3	2	2
CO2	2	3	2	3	1	1	-	-	2	-	-	2	3	2	2
CO3	2	3	2	3	1	1	-	-	2	-	-	2	3	2	2
CO4	2	3	2	3	1	1	-	-	2	-	-	2	3	2	2
CO5	2	3	2	3	1	1	-	-	2	-	-	3	3	2	2
CO6	2	3	2	3	1	1	-	-	2	-	-	3	3	2	2

FPP655: Cereals, Legumes and Oilseeds Processing Lab

School: SSBT	**Batch: 2026-2028**
Programme: M. Tech.	**Current Academic Year: 2026-2027**
Branch: FPT	**Semester:02**

1	Course Code	**FPP655**
2	Course Title	Cereals, Legumes and Oilseeds Processing Lab
3	Credits	1
4	Contact Hours (L-T-P)	0-0-2
	Course Status	Compulsory
5	Course Objective	This course has been designed to make students understand the different unit operations involved processing of legumes, cereals and oilseeds.

6	Course Outcomes	After finishing the course the students will be able to CO1: Understand the composition, structure and storage of Cereals, Legumes and Oilseeds CO2: Gain the knowledge about different anti-nutritional factors and methods of elimination of these anti-nutrients CO3: Get exposure about traditional and modern milling methods used for Cereals, Legumes and Oilseeds CO4: Develop technical know-how for the preparation of secondary products from cereals and pulses CO5: Understand the processing of oilseeds CO6: Apply the advanced knowledge of processing methods of cereals and pulses in food industries	
7	Course Description	The 'Processing Technology of Cereals, Legumes and Oilseeds' course comprises of structure, classification and composition of Cereals,Legumes and Oilseeds, different anti-nutritional factors, traditional and modern milling methods.	
8	Outline syllabus		CO Mapping
	Unit 1	*Practical based on composition of cereals, legumes and oilseeds*	
		Sub unit – b and c	CO1, CO6
	Unit 2	*Practical related to Antinutrients in cereals, legumes and oilseeds*	
		Sub unit - a and b	CO2, CO6
	Unit 3	*Practical related to milling methods*	
		Sub unit – a and b	CO3, CO6

	Unit 4	*Practical related to cereal based products*			
		Sub unit- a and b			CO4, CO6
	Unit 5	*Practical related to oilseeds processing*			
		Sub unit - a, b and c			CO5, CO6
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	CE	ETE	
		25%	25%	50%	
	Text book/s*	1. N. L. Kent, 2017, Technology of Cereals 2. Mathews, R.H. Ed., 1989, Legumes: Chemistry, Technology andHuman Nutrition			
	Other References	3. B.D. Shukla, 1992, Oil Seed Processing Technology			

List of Practical's:

Week 1	**Unit 1**	**Practical related to composition of cereals, legumes and oilseeds**	
Week 1, 2 and 3	b	Lab expt.1	Determination of starch content in cereals
	a	Lab expt.2	Determination of protein content in legumes
	a	Lab expt 3	Determination of protein content in oilseeds
	Unit 2	**Practical related to Antinutrients in cereals, legumes and oilseeds**	
Week 4, 5 and 6	a	Lab expt.4	Determination of oxalic acid in spinach leaves
	b	Lab expt.5	Determination of phytic acid in cereals
	c	Lab expt.6	Determination of tannins in tea/coffee/beans

	Unit 3	**Practical related to milling methods**	
Week 7	a	Lab expt.7	To carry out conditioning and pitting of pulses To understand the steps involved in milling of pulses
Week 8	b	Lab expt.8	To carry out conditioning and pitting of oilseeds To understand the steps involved in milling of oilseeds
	Unit 4	**Practical related to cereal based products**	
Week 9	a	Lab expt 9	Preparation of cake
Week 10	b	Lab expt 10	To bake cereal based cookies
	Unit 5	**Practical related to oilseed processing**	
Week 11	a	Lab expt 11	Extraction of oil from oilseeds using polar and non-polar solvent
Week 12	b	Lab expt 12	Determination of proteins and carbohydrate in de-oiled cake for human nutrition

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	3	-	-	-	-	-	2	-	-	2	3	3	3
CO2	-	-	-	-	-	-	-	-	2	-	-	2	2	2	2
CO3	2	-	-	-	-	2	-	2	3	-	2	2	-	3	-
CO4	2	2	-	3	-	-	2	2	3	2	-	2	3	2	3
CO5	-	-	3	3	2	2	2	-	3	2	-	3	-	-	2
CO6	-	-	2	3	2	-	2	-	3	2	-	3	-	-	2

PP657: Fermentation Technology Lab

School: SSBT	**Batch: 2026-2028**
Programme: M. Tech.	**Current Academic Year: 2026-2027**
Branch: FPT	**Semester:02**

1	Course Code	**FPP657**
2	Course Title	Fermentation Technology Lab
3	Credits	1

4	Contact Hours (L-T-P)	0-0-2
	Course Status	Compulsory
5	Course Objective	This course has been designed to make students understand the processing of fermented foods.
6	Course Outcomes	After finishing the course the students will be able to CO1: Understand the history of fermentation technology and growth kinetics of microorganisms. CO2: Understand the role of inoculum, media, and operating parameters on output. CO3: Design Fermenters to meet specific needs. CO4: Apply scale-up methods for increasing yield. CO5: Justify the use of different biochemical strategies for the production of fermented foods and components. CO6: Learn the fundamentals of food fermentation

7	Course Description	To enable students to learn the history of fermentation and understand basic concepts of fermentation technology.			
8	Outline syllabus				CO Mapping
	Unit 1	*Practical based on Fermentation process*			
		Sub unit – b and c			CO1, CO6
	Unit 2	*Practical related to Operational details of Fermentation*			
		Sub unit - a and b			CO2, CO6
	Unit 3	*Practical related Instrumentation and measurements*			
		Sub unit – a and b			CO3, CO6
	Unit 4	*Practical related to physical systems and components*			
		Sub unit- a and b			CO4, CO6
	Unit 5	*Practical related to Industrial fermentation systems*			
		Sub unit - a, b and c			CO5, CO6
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	CE	ETE	
		25%	25%	50%	
	Text book/s*	1. McNeil B. and Harvey L., "Practical Fermentation Technology", Wiley, 2008. 2. Doran P.M., "Bioprocess Engineering Principles", Academic Press, 2012. 3. Katoh S. and Yoshida F.,			

		"Biochemical Engineering", Wiley-VCH, 2009.	
	Other References	4. Stanburry PF, Whittaker A and Hall SJ. Principles of Fermentation	

List of Practical's:

Week 1	**Unit 1**	**Practical based on Fermentation process**	
Week 1, 2 and 3	b	Lab expt.1	Preparation of starter culture
	a	Lab expt.2	Preparation of RTS beverage
	a	Lab expt 3	Preparation of dahi
	Unit 2	**Practical related to Operational details of Fermentation**	
Week 4, 5 and 6	a	Lab expt.4	Preparation of pickles and chutneys, relishes and sauces
	b	Lab expt.5	Preparation of pickles and chutneys, relishes and sauces
	c	Lab expt.6	Preparation of yoghurt
	Unit 3	**Practical related to Instrumentation and measurements**	
Week 7	a	Lab expt.7	Preparation of shrikhand
Week 8	b	Lab expt.8	Study the effect of temperature, ph and concentration of glucose on fermentation

	Unit 4	**Practical related to physical systems and components**	
Week 9	a	Lab expt 9	Determine the effect of TDS of water on fermentation
Week 10	b	Lab expt 10	To determine the effect of different concentration of glucose on fermentation
	Unit 5	**Practical related to Industrial fermentation systems**	
Week 11	a	Lab expt 11	To determine the effect of temperature on yeast based fermentation
Week 12	b	Lab expt 12	To determine the influence of pH on fermentation

COURSE ARTICULATION MATRIX

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	3	-	-	-	-	-	2	-	-	2	3	3	3
CO2	-	-	-	-	-	-	-	-	2	-	-	2	2	2	2
CO3	2	-	-	-	-	2	-	2	3	-	2	2	-	3	-
CO4	2	2	-	3	-	-	2	2	3	2	-	2	3	2	3
CO5	-	-	3	3	2	2	2	-	3	2	-	3	-	-	2
CO6	-	-	2	3	2	-	2	-	3	2	-	3	-	-	2

FPP656: Dairy Technology Lab

School: SSBT	**Batch: 2026-2028**
Programme: M. Tech.	**Current Academic Year: 2026-2027**
Branch: FPT	**Semester:02**

1	Course Code	**FPP656**
2	Course Title	**Dairy Technology Lab**
3	Credits	1
4	Contact Hours (L-T-P)	0-0-2
	Course Status	Compulsory
5	Course Objective	● To identify the basic instruments used in dairy technology and their importance. ● To isolate and characterize microorganisms associated with different milk products ● To identify the presence of foreign adulterants in milk samples. ● To develop a knowledge of the use of microbiological techniques in identification and enumeration of bacteria in dairy products
6	Course Outcomes	After finishing the course the students will be able to: CO1: Demonstrate common aseptic techniques used in the dairy technology. CO2: Illustrate the importance of milk sample preparation. CO3: Understand the importance for checking adulterants in milk and products. CO4: Understand basic techniques used in the estimation of platform tests. CO5: Recognize various techniques for preparation of different milk products.
7	Course Description	The course will introduce students to methods used in chemical examination of milk products. Students will be exposed to practical training on chemical testing of milk based products.
8	Outline syllabus	CO Mapping

	Unit 1	**Practical based on understanding of various safety and sterilization techniques in dairy technology**			**CO1,CO6**
		Sub unit - a, b and c detailed in Instructional Plan			
	Unit 2	**Practical related to platform test.**			**CO2,CO6**
		Sub unit - a, b and c detailed in Instructional Plan			
	Unit 3	**Practical related to check adulteration in raw milk.**			**CO3,CO6**
		Sub unit - a, b and c detailed in Instructional Plan			
	Unit 4	**Practical based on preparation of various milk products.**			**CO4,CO6**
		Sub unit - a, b and c detailed in Instructional Plan			
	Unit 5	**Practical based on detection of adulteration in ghee**			**CO5, CO6**
		Sub unit - a, b and c detailed in Instructional Plan			
	Mode of examination	Jury/Practical/Viva			
	Weight age Distribution	CA	CE	ETE	
		25%	25%	50%	
	Text book/s*	FSSAI Manual for Analysis for Food Products.			
	Other References	FSSAI Manual for Analysis for Milk and Milk products .			

List of Practical's:

Week 1	**Unit 1**	**Practical based on understanding of various safety and sterilization techniques in dairy technology**	
	a	Lab expt.1	Preparation of sample of milk.
	b	Lab expt.2	To learn the importance of cleaning and sterilization of labwares in dairy technology.
Week 2	**Unit 2**	**Practical related to platform test.**	
	a	Lab expt.3	Organoleptic evaluation. COB Test Alcohol Test Sediment Test Resazurin Test
	B	Lab expt.4	Determination of Acidity of milk.
	c	Lab expt.5	Determination of fat content and fat globule measurement in milk.
Week5	**Unit 3**	**Practical related to adulteration in raw milk.**	
	a	Lab expt.6	Formalin Test
	b	Lab expt.7	Sugar Test
	c	Lab expt.8	Boric Acid Test
Week 7	Mid term		
	a, b, c	Lab expt.6	Determination of over run in icecream.
	Unit 4	**Practical based on preparation of various milk products.**	
	a	Lab expt.7	Development of pineapple dahi and flavored drinks

	B	Lab expt.8	Preparation of chakka and srikhand.
	c	Lab expt.9	Preparation of paneer, butter,basundi.
Week 14	**Unit 5**	**Practical based on detection of adulteration in ghee.**	
	a	Lab expt.10	Preparation of ghee and detection of adulteration in ghee.
	b	Lab expt.11	Quality assessment of butter.

COURSE ARTICULATION MATRIX

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	2	-	2	-	2	-	-	2	3	-	3	2	2	3
CO2	2	11	-	1	-	-	-	-	2	-	-	2	3	2	2
CO3	1	2	3	2	3	-	-	-	2	-	-	3	3	1	2
CO4	1	3	2	3	3	-	-	-	3	2	1	2	2	-	2
CO5	1	-	3	1	-	2	2	-	3	-	-	3	3	1	3
CO6	1	2	2	2	3	3	1	-	3	-	1	3	3	2	2

M. Tech Dissertation Course Evaluation Scheme & COs

1. Evaluation Scheme

Stage	Evaluator	Criteria	Marks	Bloom's Taxonomy (BTL)
Zero Evaluation	Guide (10)	Problem identification, clarity of objectives	10	BTL-2, BTL-3
Zero Evaluation	Panel (40)	Relevance, literature survey, feasibility	40	BTL-2, BTL-3, BTL-4
First Evaluation	Guide (10)	Progress in methodology development	10	BTL-3, BTL-4
First Evaluation	Panel (40)	Experimental design, novelty	40	BTL-3, BTL-4
Second Evaluation	Guide (10)	Data collection quality	10	BTL-3, BTL-4
Second Evaluation	Panel (40)	Analysis, interpretation	40	BTL-4, BTL-5
Third Evaluation	Guide (10)	Dissertation draft readiness	10	BTL-4, BTL-5
Third Evaluation	Panel (40)	Results, discussion, conclusions	40	BTL-4, BTL-5, BTL-6
Final Evaluation	Guide (10)	Research effort, supervision assessment	10	BTL-4, BTL-5
Final Evaluation	Panel/External (40)	Final dissertation, defense	40	BTL-5, BTL-6

2. Course Outcomes (COs)

1. CO1: Identify research problems and formulate objectives based on literature. (BTL-2,3)
2. CO2: Design and implement methodologies for experiments/research. (BTL-3,4)
3. CO3: Collect, analyze, and interpret experimental/research data. (BTL-4,5)
4. CO4: Prepare a comprehensive dissertation with critical discussion. (BTL-4,5)
5. CO5: Defend research outcomes through oral presentations and publications. (BTL-5,6)

3. CO–Evaluation Mapping

Evaluation Component	CO1	CO2	CO3	CO4	CO5
Zero Evaluation (Guide + Panel)	✔	-	-	-	-
First Evaluation (Guide + Panel)	-	✔	-	-	-
Second Evaluation (Guide + Panel)	-	✔	✔	-	-
Third Evaluation (Guide + Panel)	-	-	✔	✔	-
Final Evaluation (Guide + Panel/External)	-	-	✔	✔	✔

4. Bloom's Taxonomy Mapping

- BTL-2 (Understand): Understand problem statements and literature review.
- BTL-3 (Apply): Apply research methods in experiments.
- BTL-4 (Analyze): Analyze results and methodology.
- BTL-5 (Evaluate): Critically evaluate findings and contributions.
- BTL-6 (Create): Write dissertation, propose new solutions, publish.

Rubrics for M. Tech Dissertation

Criteria	**Excellent (8-10)**	**Good (5-7)**	**Needs Improvement (0-4)**
Understanding of Literature / Background	Demonstrates comprehensive understanding, critical insights, and connects knowledge gaps effectively.	Shows adequate understanding with some critical inputs but lacks depth in certain areas.	Limited understanding, superficial review, lacks clarity in identifying research gaps.
Presentation & Communication	Clear, concise, professional presentation with logical flow and strong communication.	Adequate presentation, mostly clear but with minor gaps in flow or communication.	Unclear presentation, weak structure, poor communication of ideas.
Methodology / Research Design (for dissertation)	Well-structured, justified, and innovative methodology with	Adequately structured methodology but with some lack of	Weak methodology, poorly justified, lacks scientific rigor.

	strong scientific reasoning.	justification or innovation.	
Critical Thinking & Problem-Solving	Demonstrates high-level critical analysis, problem-solving, and synthesis of ideas.	Shows reasonable analytical skills but limited problem-solving depth.	Minimal critical thinking, lacks originality and problem-solving capacity.
Documentation & Referencing	Accurate, consistent referencing, well-documented work following academic standards.	Minor errors in referencing or documentation but acceptable overall.	Frequent referencing errors, poor documentation, lacks academic integrity.

	Mode of examination	Jury/Practical/Viva			
	Weight age Distribution	CA	CE	ETE	
		25%	25%	50%	

M.Tech Seminar Course Evaluation Scheme & Cos

1. Evaluation Scheme

Stage	Evaluator	Criteria	Marks	Bloom's Taxonomy (BTL)
Zero Evaluation	Guide (10)	Topic selection, relevance, initial literature review	10	BTL-1, BTL-2
Zero Evaluation	Panel (40)	Review depth, objectives, clarity	40	BTL-2, BTL-3
First Evaluation	Guide (10)	Progress, understanding of review	10	BTL-2, BTL-3
First Evaluation	Panel (40)	Critical analysis of literature, problem formulation	40	BTL-3, BTL-4
Second Evaluation	Guide (10)	Draft quality, improvement	10	BTL-3, BTL-4
Second Evaluation	Panel (40)	Synthesis, comparison, novelty	40	BTL-4, BTL-5
Third Evaluation	Guide (10)	Final draft readiness	10	BTL-4, BTL-5

Third Evaluation	Panel (40)	Quality of review, conclusions, presentation	40	BTL-4, BTL-5, BTL-6

2. Course Outcomes (COs)

CO1: Identify and select relevant research topics in food science and technology. (BTL-1,2)
CO2: Conduct comprehensive literature review and summarize findings effectively. (BTL-2,3)
CO3: Analyze and synthesize research articles to identify research gaps. (BTL-3,4)
CO4: Prepare a critical review report with structured analysis. (BTL-4,5)
CO5: Present review outcomes clearly through seminars and discussions. (BTL-4,5,6)

3. CO–Evaluation Mapping

Evaluation Component	CO1	CO2	CO3	CO4	CO5
Zero Evaluation (Guide + Panel)	✔	✔	-	-	-
First Evaluation (Guide + Panel)	-	✔	✔	-	-
Second Evaluation (Guide + Panel)	-	-	✔	✔	-
Third Evaluation (Guide + Panel)	-	-	-	✔	✔

4. Bloom's Taxonomy Mapping

BTL-1 (Remember): Recall fundamental concepts and literature sources.
BTL-2 (Understand): Summarize and explain concepts from literature.
BTL-3 (Apply): Apply literature knowledge to identify gaps.
BTL-4 (Analyze): Analyze, compare, and critique literature findings.
BTL-5 (Evaluate): Evaluate research contributions critically.
BTL-6 (Create): Formulate a structured review report and presentation.

Rubrics for M. Tech Seminar (Review-based)

Criteria	**Excellent (8-10)**	**Good (5-7)**	**Needs Improvement (0-4)**

Understanding of Literature / Background	Demonstrates comprehensive understanding, critical insights, and connects knowledge gaps effectively.	Shows adequate understanding with some critical inputs but lacks depth in certain areas.	Limited understanding, superficial review, lacks clarity in identifying research gaps.
Presentation & Communication	Clear, concise, professional presentation with logical flow and strong communication.	Adequate presentation, mostly clear but with minor gaps in flow or communication.	Unclear presentation, weak structure, poor communication of ideas.
Methodology / Research Design (for dissertation)	Well-structured, justified, and innovative methodology with strong scientific reasoning.	Adequately structured methodology but with some lack of justification or innovation.	Weak methodology, poorly justified, lacks scientific rigor.
Critical Thinking & Problem-Solving	Demonstrates high-level critical analysis, problem-solving, and synthesis of ideas.	Shows reasonable analytical skills but limited problem-solving depth.	Minimal critical thinking, lacks originality and problem-solving capacity.
Documentation & Referencing	Accurate, consistent referencing, well-documented work following academic standards.	Minor errors in referencing or documentation but acceptable overall.	Frequent referencing errors, poor documentation, lacks academic integrity.