

MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY BATHINDA-151001 (PUNJAB), INDIA

(A State University Estb. by Govt. of Punjab vide Punjab Act No. 5 of 2015 and Approved u/s 2(f) & 12 (B) of UGC; Member AIU)

Department: **DEPARTMENT OF FOOD SCIENCE AND TECHNOLOGY**

Program: B.Sc. (Food Science and Technology)

COURSE ARTICULATION MATRIX (STUDY SCHEME: 2018)

Subject	S Code	Semester	Credit	Duration (Hrs)	LTP	cOs	Statement	P01	P02	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	P012	PSO1	PSO2	PSO3	PS04
						001	CO1 Understanding the various theories related to growth of micro-organisms and their disease causing abilities	2												2			
BIOLOGY					-	C02	CO2 Remembering the general characteristics of micro-organisms in relation to their effect on plant and human health.						2							3			
GENERAL MICROBIOLOGY	BFOTS1-101	1	4	60	310	03	CO3 Selection of suitable tools, equipments and environmental conditions for the growth of microorganisms.					3										3	
GE					-	C04	CO4 Identifying the appropriate method for the control of micro-organisms that result in food preservation.		3														3
					-	502	CO5 Creating the ability to communicate with food science community and society about the merits and demerits of micro-organisms.							3							3		

	1 1		l		1 1		CO1 Creating avanances shout various		1		l			I	I			_	1		
						01	CO1. Creating awareness about various disciplines of food science and	3										3			
LOGY						Ö	technology and their applications in food production and preservation.														
ONHO						C02	CO2. Understanding about selection of appropriate techniques for the production					2								3	
D TE(2					8	of nutrient dense foods with reduced toxicity.														
) FOC	1-10				0	3	CO3. Acquire knowledge about compositional and nutritional properties			3								2			
TON TC	BFOTS1-102	1	4	60	31	8	of different cereal grains that aids in the production of different food products.														
INTRODUCTION TO FOOD TECHNOLOGY						C04	CO4. Identifying problems related to the degradation of fats and their solutions that results in preservation.		3												3
- NI						500	CO5. Imparting knowledge about various physical and chemical changes occur during processing	3										2			
						7	CO1. Imparting knowledge about basics of mathematics that helps the students	2										3			
						C01	with biology background in understanding food engineering														
s	_	1	4	60		12	CO2. Developing an ability to understand the use of calculations and				3							2			
MATIC	103	_	7			C02	numerical in solving problems related to processing and preservation.														
MATHEMATICS	BFOTS1-103				0	m m	CO.3 Engaging students in life-long learning by creating a linkage between	2									1		2		
Σ	BF				31	8	mathematics and food sciences														
					-		CO4. Selection of appropriate techniques and methodologies for application in food					3								3	
							engineering														
						S	CO5. Developing an ability of cost analysis involved during construction									3					2
						8	and designing of food processing plants														
							CO1. Understanding the basics of computers and terminologies used	3										3			
						C01	computers and terminologies used														
AND						J															
							CO.2 Creating an ability to identify problems related to security against		3												3
R SCIE	BF				31	C02	computer viruses along with their preventive measures.														
COMPUTER SCIENCE		1	4	60		J	F														
CON					-		CO.3 Creating an ability to communicate effectively with attractive				3								3		
						CO3	presentations and report writing with society.														
						-															
										i											

				CO.4 Providing knowledge about					3		2		
			9	collection, storage and analysis of data									
			O	with minimum human errors.									

						500	co.5 Developing the management skills by imparting knowledge about applications of computers in management of data in every field									3				2	
						CO1	CO.1 Understanding about working of different equipment's of microbiology and their applications in food production and preservation.			3								2			
LOGY LAB-I	-6					C02	CO.2 Imparting knowledge about practical handling of microbiological tools that ensures safety of food products.					3						3			
GENERAL MICROBIOLOGY LAB-1	BFOTS1-105	1	2	30	004	03	CO.3 Enumeration of microbial load of different food products with suitable techniques and interpret the factors associated with them.				3										3
GENERAI	BF					CO4	CO.4 Selection of suitable methods for the cultivation, isolation and storage of micro-organisms that can be beneficial for human health and environment.							3						3	
						CO5	CO.5 Creating ability to work effectively both individually and as a team during the collection of samples from different sources.								3				3		
						CO1	CO.1 Providing knowledge about various cell organelles to the students from non-biology background that helps them in understanding the need of nutrition for health.	3										3			
ES	02					C02	CO.2 Understanding the physiology and anatomy of human body that create an ability to develop foods as for allergic	1										2			
LIFE SCIENCES	BPHARO-002	1	4	60	310	03	CO.3 Identifying the micro-organisms responsible for infectious and contagious diseases along with their preventive measures		3												3
						C04	CO.4 Creating an ability of developing vaccines and antibiotics that can be beneficial for society and environment.						3							3	
						502	CO.5 Applying genetic engineering in food and human health that can support agro-food industries									2				3	
COMMU	вномао-	3	0	45	300	CO1	CO.1 Recognizing the need of command over the communicative skills engage students in independent and life-long learning.										3		2		

						C02	CO.2 Creating an ability to communicate effectively with food science community and the society with effective report writing and presentations.								3			3		
						03	CO.3 Engaging students in team work by organizing group discussions on different topics.							3			1			
						CO4	CO.4 Increasing the probability of employment in a reputed industry or organization by improving the interview skills.									2				2
						CO5	CO.5 Creating an ability to identify problems and solutions by improving the listening skills of the students.								3					2
II A5						CO1	CO.1 Identifying the problems arise during storage of fruits and vegetables and resolve them by basic and advanced tools.		3											3
INTRODUCTION TO FOOD TECHNOLOGY II						C02	co.2 Understanding the compositional and nutritional properties of fruits and vegetables that results in the production of value-added food products.	2											3	
TION TO FOOI	BFOTS1-201	2	4	60	310	CO3	cO.3 Applying ethical principles during the handling of animals before processing and preservation of animal products.						3					2		
INTRODUC						CO4	CO.4 Creating the knowledge about overview of general processing methods of Indian spices and their therapeutic uses.					3					3			
						500	co.5 Imparting the knowledge regarding usages of appropriate techniques for the quality evaluation of various food products.				3									3
						C01	CO.1 Imparting the knowledge regarding various methods of preservation of food and their effect on physiochemical properties of food.	3									3			
PRINCIPLES OF FOOD PRESERVATION	BFOTS1-202	2	4	60	310	C02	CO.2 Selecting appropriate equipment's for preservation of different food products with an objective of minimal degradation of nutrients.				3									3
PRINCIPL						CO3	CO.3 Synthesize information for freezing and drying of different food products with the use of freezing and drying curves.			3							3			

					_	CO4	CO.4 Identifying the problems associated with food spoilage and selection of suitable methods of preservation		3											3
						CO5	CO.5 Creating the awareness about the effect of chemical and physical preservation techniques on health and nutritional components of food.					3						2		
						001	CO.1 Creating the awareness about the multidisciplinary nature of environmental studies that promotes individual and team work to resolve issues related to depletion of natural resources.	3										3		
NTAL	203					C02	CO.2 To engage students in various environmental activities that promotes the life-long learning.				3							2		
ENVIRONMENTAL STUDIES	BFOTS1-203	2	3	45	300	CO3	CO.3 Understanding the concept of ecosystem and its role in sustainable development.						3				3			
19						CO4	CO.4 Identify the problems associated with environmental pollution and design effective solutions in context to society and health.		3											3
						500	CO.5 Creating an ability to communicate effectively about the problems of environment degradation and solutions for conservation with society at large.								3			2		
						CO1	cO.1 Understanding the chemical structure of food components in relation to shelf life and nutritional value of food products	3									3			
	14					C02	CO.2 Identifying the suitable methods for the production of novel food products.			2										3
FOOD	BFOTS1-204	2	2	30	004	CO3	CO.3 Imparting the knowledge of physicochemical properties of food among students.				3						3			
	B					C04	CO.4 Creating the awareness about the functions of various food components.			3								2		
						500	CO.5 Remembering the concept of minerals and vitamins associated with human health for various life long benefits.					3							3	

	1 1					1	CO.1 Imparting the knowledge of basic		1	1	1	3	1	I	I		1	3	ı	ı	 1
LABII						CO1	instruments used in food industry for analysis of various components of food.					3						3			
CHNOLOGY	5					c02	CO.2 Performing various test for chemical analysis of food.						3							2	
INTRODUCTION TO FOOD TECHNOLOGY LAB II	BFOTS1-205	1	2	30	004	603	CO.3 Understanding the effects of hydrothermal processes on produce.		3									3			
DUCTION T	Bf					CO4	CO.4 Conduct test for qualitative analysis of various food components.			3											3
INTRO						500	CO.5 Collection of data from various quality assessment methods and their interpretation into valid conclusions				3										2
LAB-III						CO1	CO.1 Preparation of value added products using various fruits and vegetables.			3										3	
SERVATION	2					CO2	CO.2 Understanding the effects of hydrothermal processes on different vegetables.		3									3			
FOOD PRE	BFOTS1-205	2	2	30	004	03	CO.3 Performing the analysis of various packaged food.	3													2
PRINCIPLES OF FOOD PRESERVATION LAB-III	BF					CO4	CO.4 Applying different food preservation techniques for preservation of various food.						3							3	
PRII						500	CO5 Gaining practical knowledge of various instruments used in food processing industry					3									3
NOLOGY	1-301					CO1	CO.1 Understanding the physical, chemical and nutritive value of milk for processing of liquid milk and as raw material for the production of various milk products as per the legal standards specified by various agencies.	3										1		3	
DAIRY TECHNOLOGY	BFOTS1-	3	4	60	310	003	cO.2 Creating awareness about selection of equipment's for the processing and quality assessment of milk and milk products						3								3
						603	CO.3 Identifying the various defects arise during processing and storage of milk and milk products along with the causes behind these defects.		3												2

	1 1			1			CO A Development of Construction of the	1	ı	-			1		1	1	-	- 1		1	ı	<u> </u>	
						C04	CO.4 Development of fermented milk and milk products with the selection of appropriate micro-organisms having some therapeutical effects.			3												3	
						500	cO.5Creating ability to communicate efficiently with the developing milk processing industries and help them to manage projects by resolving their issues										з				3		
S						CO1	CO.1 Developing the ability to check the maturity of fruits and vegetables along with its suitability for processing into value added food products	3												2			
AND VEGETABLE	7	3	4	60		CO2	CO.2 Understanding quality analysis of fruits and vegetables along with the factors affecting processing and interpret valid conclusions for effective preservation of food products.												2				3
TECHNOLOGY OF FRUITS AND VEGETABLES	BF0151-302				310	603	CO.3 Identifying the problems related to spoilage of fruit and vegetable products and use of preservatives along with processing techniques to prevent spoilage						3										3
TECHNO						CO4	CO.4 Creating ability to utilize the fruit and vegetable industry waste to reduce the environmental stress.			3												3	
						500	CO.5 Selection of suitable techniques for the production of food products with enhanced shelf life and minimal degradation of nutrients.							3									2
SAFETY						CO1	CO.1 Understanding the role of microorganisms in production and spoilage of raw along with processed food.	3												3			
LOGY AND FOOD SAFETY	51-303	3	4	60	10	200	CO.2 Identifying the enumeration methods for micro-organisms and implementation of different preservative methods in combination to preserve food.					3											3
FOOD MICROBIOL	BFOTS				3.	603	cO.3 Collecting knowledge regarding microbial quality of raw, processed and spoiled foods and interpret that in context to public health.						3									2	
FOC						CO4	CO.4 Creating awareness regarding applications of various food safety tools for the production of safe food meeting the legal standards.				3											3	

							CO.5 Analyzing the nature of various food safety hazards and control them to							3							2
						001	ensure environmental sustainability CO.1 Collecting data from different platform tests and implementing the information to ensure suitability of raw				3										3
Y LAB-IV	+					C02	material for processing. CO.2 Applying standard protocols for the production of safe milk and milk products meeting the legal specifications.							2						3	
DAIRY TECHNOLOGY LAB-IV	BFO151-304	3	2	30	004	CO3	CO.3 Creating ability to determine the quality of milk and milk products and ensuring their safety for human consumption with certain limitations.					3								3	
DAII						CO4	CO.4 Understanding the working and applications of various dairy equipments in milk processing.						3					3			
						502	CO.5 Developing the spirit of individual and team work by familiarizing the students with industrial environments		3										3		
LES LAB V						CO1	CO.1 Applying theoretical knowledge for the production of value added products meeting the specified needs of society			3										3	
VEGETAB						C02	cO.2 Evaluating the quality of food products using basic and advanced equipments.						3								3
FRUITS AND	BFOTS1-305	3	2	30	004	CO3	CO.3 Developing food preserves to enhance the shelf life along with reduction in wastage of perishable foods	2												2	
TECHNOLOGY OF FRUITS AND VEGETABLES LAB V	BF(C04	cO.4 Reducing environmental stress by utilizing by-products of fruit and vegetable industry by converting them into attractive food products.							3						3	
TECH						503	CO.5 Creating an ability to share views related to a food industry and their management during industrial visits									3			2		
)BIOLOGY SAFETY	1-306				4	CO1	CO.1 Understanding the use of various equipments of microbiology and their applications in food safety.					3						3			
FOOD MICROBIOLOGY ANDFOOD SAFETY	BFOTS1-306	3	2	30	004	CO2	CO.2 Creating an ability to identify different micro-organisms and relate their characteristics with the safety of human and plant health.		3											3	

						03	CO.3 Applying appropriate methods to analyze the microbial safety of food products and implement that information to determine the efficiency of preservation methods.			2											2
						CO4	CO.4 Creating skill for development of fungal and fermented foods reducing stress on environment to fulfill the need of nutrient rich foods for growing population						3							2	
						500	CO.5 Identifying the problems associated with spoilage of raw and processed foods due to different microorganisms and applying suitable preservation methods.					3									3
						CO1	CO.1 Understanding the basic conceptsof Entrepreneur, Entrepreneurship and Enterprise in relation to food Industry.	2										3			
URSHIP	-311	3	3	45		C02	CO.2 Developing entrepreneurial skills in the students and ability to communicate effectively on the issues ofan Entrepreneur and Entreprise with the food science community.								3				3		
ENTREPRENEURSHIP DEVELOPMENT	BFOTD1.				300	CO3	CO.3 Developing a spirit of individual and team work by teaching them with thehelp of case studies of successful entrepreneurs.		2										1		
					_	CO4	CO.4 Creating an ability to identify opportunities in business and generationof unique business ideas.									3					1
						502	CO.5 Applying the principles of management to manage projects asindividual and team.										2			2	
						C01	CO.1 Applying the knowledge of microbiology for the production and preservation of food products.	3												3	
NTATION	BFOTD1-312	3	3	45	300	C02	CO.2 Understanding the working of various fermenters for the production of healthy food with increased palatability.				3							3			
FOOD FERMENTATI TECHNOLOGY	BFO					CO3	CO.3 Reducing the stress on environment with the production of organic acids and vitamins by using micro-organisms and utilizing industrial waste				3									3	

						CO4	CO.4 Creating an awareness about the quality assessment of raw material and its usage for the production of safe and healthy food products.					3					2		
						500	CO.5 Selecting suitable type of fermentation for the production of specific product and interpret the wholeinformation related to the specific product for efficient recovery.			3									3
						CO1	CO.1 Understanding the general characteristics of various food additives and their application in improvement of physical and chemical properties of food					3				3			
	[3	·	•	45		C02	CO.2 Collecting basic knowledge regarding the mechanism of action of various additives and utilize it for the production of healthy food products with enhanced shelf life.	3								2			
FOOD ADDITIVES	BFOTD1-313	3	3	45	300	603	cO.3 Creating awareness about different techniques for the processing, preservation and extraction of essential oils from various Indian spices.			3							2		
						CO4	CO.4 Understanding the importance of legal standards specified for the use of additives and applying that knowledge for the production of safe and healthy food products.							3				3	
					-		CO5. Differentiating between natural-, and synthetic food colors and their applications			3						2			
						C01	cO.1 Creating an awareness about problems of drug abuse by proving a comfortable environment in class that engage students in life-long learning.	2									3		
DRUG	INCC0-004	3	0	30	200	C02	CO.2 Understanding the concept of drug dependence, addiction and tolerance along with their solutions develops a passion to work for the wellness of society.		3										3
1 4	BMN					CO3	CO.3 Creating an ability to communicate effectively on various long term and short term effects of drug abuse.					2				2			
						CO4	CO.4 Encouraging individual and team work by creating awareness about the consequences of drug abuse and their effect on individual, parents and society							3			3		

						500	CO.5 Imparting moral values to the students that aids in the development of an individual and society.						3						2	
OILSEEDS						C01	CO.1 Understanding the structure and composition of different cereal grains and their effect on the quality of processed food.	3									3			
LSES AND C		4	4	60		C02	cO.2 Identifying the suitable methods for the processing of cereal and their conversion into different food products.	2			1									3
TECHNOLOGY OF CEREALS, PULSES AND OILSEEDS	BFOTS1-401	7			310	603	CO.3 Remembering the concept of conversion of cereal grain in value added product and their application related with human health.	1		1	2								2	
CHNOLOGY O	В					C04	co.4 Imparting basic knowledge of physiochemical properties of different cereals and their effect on processing of food.			3		3					3			
<u> </u>						CO5	CO.5 Acquiring the knowledge of development of food products and processes using cereal grains.						3		2		3			
УÐС						CO1	CO.1 Providing the knowledge of structure and composition of different meat and meat products.	3		1							3			
AT TECHNOL	12	4	4	60		C02	CO.2 Understanding the techniques used for conversion of eggs into different products and their impact on different food components.	3					2						3	
EGG, POULTRY AND MEAT TECHNOLOGY	BFOTS1-402	4	4	60	310	CO3	CO.3 Applying the ethical principles during handling of animal and their conversion into meat for developing different meat products.							3				2		
EGG, POL						CO4	CO.4 Imparting the knowledge of different quality evaluation methods for meat and meat products.		2			3								2
						502	CO.5 Creating awareness regarding by product utilization of meat industry						2		2		2			
NT	51-403	4	4	60	310	CO1	CO.1 Understanding the concept and importance of personal hygiene and its role in food safety.					2					3			
FOOD PLANT HYGIENEAND	BFOTS				31	C02	CO.2 Familiarizing the students with different types of byproduct utilization and their application in various fields.	3									2			

	1 1				1		CO 2 Creation the longuidades of	1	1	1	1	1 2		1						ı	2
						CO3	CO.3 Creating the knowledge of different waste disposal and its treatment by various physical and chemical agents.					2									3
						C04	CO.4 Applying distinctive methods of cleaning and sanitation to maintain industrial hygiene.			3				2						2	
						CO5	CO.5 Aware the students about design and layout of effluent treatment plant used in various food industry.							1		2		3			
EDSLAB						CO1	CO.1 Understanding the concept and importance of personal hygiene and its role in food safety.	3										3			
S AND OILSE VII					_	C02	CO.2 Familiarizing the students with different types of byproduct utilization and their application in various fields.					2								2	
TECHNOLOGY OF CEREALS, PULSES AND OILSEEDSLAB	BFOTS1-404	4	2	30	004	03	CO.3 Creating the knowledge of different waste disposal and its treatment by various physical and chemical agents.			3			2								3
OGY OF CEI	B					CO4	CO.4 Applying distinctive methods of cleaning and sanitation to maintain industrial hygiene.		2					2							2
TECHNOL						CO5	CO.5 Aware the students about design and layout of effluent treatment plant used in various food industry.		2							2		2			
						C01	CO.1 Conducting various tests required for grading and quality evaluation of different meat and meat products.	2													3
IEAT						C02	CO.2 Preservation of meat products by using appropriate preservation methods.					3								3	
, POULTRY AND MEAT TECHNOLOGY	TS1-405	4	2	30	004	03	cO.3 Development of numerous meat and meat products by suitable methods to meet specified needs of the public health.								3					3	
EGG, PO	BFOTS1				•	CO4	CO.4 Familiarize students about ethical principles during slaughtering and dressing of meat for the conversion of muscles into meat			3			2						2		
					-	CO5	CO.5 Imparting the concept and practical knowledge of different meat processing operation from farm to folk.									2	1	3			

	1 1				1		CO 1 Understanding the working and			1	3		1					2			1
						001	CO.1 Understanding the working and principles of various equipments used to determine the safety of food.				3							2			
E AND						C02	CO.2 Imparting knowledge regarding safety standards of various food products along with their analysis.	3												3	
FOOD PLANT HYGIENE AND SANITATION	BFOTS1-406	4	2	30	004	CO3	CO.3 Identifying various problems related to food safety with the help of appropriate techniques and conclude their solutions	2					1								3
FOOD	BFOT					C04	CO.4 Developing the spirit of team work during sample collection from various sites in the university.		3										2		
						500	co.5 Understanding the impact of different processing techniques on water and environment.								2		1	3			
						C01	cO.1 Understanding the concept of nutraceutical and functional food and their associated health benefits.	3										3			
IAL FOODS		4	4	60		C02	CO.2 Familiarize the students about the functions of various types of nutraceutical compounds, sources and their role in promoting human health	2					2							2	
NUTRACEUTICAL AND FUNCTIONAL FOODS	BFOTD1-411	4	4	60	400	03	cO.3 Creating the knowledge of various sources of function foods and their potential for use in improving human health.									2					2
CEUTICAL A	В					CO4	CO.4 Imparting the knowledge of fermented foods and their role in various harmful diseases.	2									1	3			
NUTRA						500	CO.5 Aware the students about the future prospects of various health promoting foods and their potential for use in promoting human health.					3			2				2		
	71					CO1	cO.1 Creating the ability to understand about various nutraceuticals and functional foods available in the market and their associated health benefits.	3										3			
ICAL AND F	BFUIDI-41	4	2	30	004	C02	CO.2 Familiarize the students with the approach behind development of nutraceuticals and functional foods.	3				1						2			
NUTRACEUT	В					03	cO.3 Aware the students about analysis of compounds responsible for imparting nutraceutical properties to the food product.			3		2							1		

						CO4	CO.4 Imparting the knowledge about formulation and development of various nutraceutical and functional foods.	1					2					3	
					•	502	CO.5 Applying various estimation techniques to determine different components present in food.						1		2				3
						001	CO.1 Familiarize the students with current scenario and economic importance of Bakery Industry in India.	3									3		
 		4	4	60		005	CO.2 Aware the students with different categories of bakery products and their possible uses.			3							3		
BAKERY TECHNOLOGY	71-413				400	03	cO.3 Understanding the concept and techniques required for formulation of different bakery products.				3								3
BAKERY TE	BFOIDI-413					C04	CO.4 Impart the knowledge of different ingredients used and their role in the bakery products formulation						2		2		3		
						CO5	CO.5 Providing knowledge about the development to modified bakery products with special needs.			3		2						3	
						CO1	CO1. Imparting knowledge regarding selection of ingredients for the development of various baked products and ensuring their safety to the allergic persons	2					1				3		
GY LAB-XI	14					C02	CO2. Familiarizing students with methodologies of sensory evaluation of baked products	2			1						2		
BAKERY TECHNOLOGY LAB-XI	BFOTD1-414	4	2	30	004	03	CO3. Determination of various quality attributes of baked products		1				2						2
BAKERY						C04	CO4. Development of various baked products adhering to legal standards			3		1						3	
						502	CO5. Creating awareness regarding ingredients falling under category of allergens as per legal standards					2			2			2	
UNIT OPERATIONS IN	31-5-1					CO1	CO.1 Understanding the concept of unit operation and various preliminary unit operations required for material handling.	3									3		
UNIT	BFOTS1-5-1				3	C02	CO.2 Understanding the principles and working of equipments used in food industries.				3						3		

		5	4	60		03	CO.3 Formulate and analyze the problems related to unit operations usedin food engineering.				3								3
						CO4	cO.4 Creating awareness regarding selection and application of tools and techniques used for the processing and storage of foods.			3							2		
						502	CO.5 Applications of various processing methods in food industries							3				2	
PACKAGING	705-1	5	4	60	.0	C01	CO.1 Imparting knowledge regarding importance of packaging in foods.	3								3			
FOOD P4	BFOTS				31	C02	CO.2 Understanding of various environmental concerns related to food packaging.					3						2	

	1 1						I		1	1	2	1	1		2			2		
						03	CO.3 Creating awareness regarding novel methods of food packaging.				3				2			2		
					-	C04	CO.4 Selection and application of appropriate packaging materials andtechniques depending on the requirements of food products.			3										2
					-	502	CO.5 Understanding of different types of packaging materials used in food packaging									2	3			
OLOGY						C01	CO.1 Imparting the knowledge regarding manufacturing and deterioration of sugar.			3							3			
SUGAR AND CONFECTIONARY TECHNOLOGY		5	4	60		C02	CO.2 Understanding of icings, toppings and confectionary.	3									3			
ONFECTION	BFOTS1-503	5	4	00	400	03	CO.3 Utilization of by-products of sugar industry.					3							2	
SAR AND CC	BFOT					C04	cO.4 Creating awareness regarding processing methods of cocoa and chocolate used in food industries.		2				2				3			
SUG						02	CO.5 Understanding various defects of chocolate.					3			2					2
						C01	CO.1 Imparting knowledge about testing of physic-mechanical parameters of packaging materials.	3									3			
LAB-VI		5	2	30		C02	CO.2 Understanding of principle and working of FFS machine.				3						3			
D PACKAGING LAB XII LAB-VI	BFOTS1-504	3	۷	30	004	CO3	CO.3 Creating awareness about the recent advances in food packaging		2									2		
ID PACKAGI	BFOTS					C04	co.4 Analyzing the effect of packaging on shelf life to food products in order toensure food safety.						3			1			3	
F00						500	CO.5 Quality assessment of packaged food products					2			2					2
SUGAR AND CONFECTIO	BFO151- 505	5	2	30	004	CO1	CO.1 Imparting knowledge about manufacturing of sugar and confectionary based products.	3									3			

	1 1			1			CO 2 Chudanta harrana anno ahant		l	l	1	2			1					3	
						C02	CO.2 Students become aware about manufacturing of confectionary products.					3								3	
					-	CO3	CO.3 Evaluation of various quality parameters of confectionary products.							2							2
						C04	CO.4 Understanding the mode of working in industrial setup as an individual and as a team.			3									3		
						C05	CO.5 Understanding of various types of packaging materials used for confectionary.		3									3			
OGY						C01	CO.1 Imparting knowledge classification, composition and uses of spices and flavors.						3					3			
TECHNOL		_	4	60		C02	cO.2 Understanding about processing techniques of spices.	3												2	
SPICES AND FLAVOR TECHNOLOGY	BFOTD1-511	5	4	60	400	03	CO.3Understanding of flavoring compounds, its classification and its application in food industries							2				3			
SPICES A	BFOTE					C04	CO.4 Creating awareness about microbial contamination and insect infestation in spices and its control.			2											3
					-	502	CO.5 Analyzing the role of flavoringsand their stability during processing.		2							2				3	
AB XIV						CO1	CO.1 Imparting knowledge of proximate composition of spices.	3										3			
HNOLOGY I			2	20	-	C02	CO.2 Understanding of adulteration in spices.			2								2			
LAVOR TEC	BFOTD1-512	5	2	30	004	CO3	CO.3Evaluation of organoleptic properties of spices for their appropriate use in food products.		2			1								2	
SPICES AND FLAVOR TECHNOLOGY LAB XIV	BFO.					CO4	CO.4 Analysis of microbiological quality of spices to ensure their safety for human consumption							3						3	
SP						CO5	CO.5 Quality assessment of different spices.				3		2								2

	1 1			ı -				2	1		1					1	1		2	1	1	
						001	CO.1 Imparting knowledge of nutritional importance of fats and oils in human nutrition.	3											3			
-ATS					•	C02	CO.2Understanding the extraction andprocessing techniques of fats and oils used at home and industrial scale.			2							1		3			
TECHNOLOGY OF OILS AND FATS	-513	5	4	60	400	03	CO.3 Analyzing the physico-chemical properties of oils and fats for their suitability in food products		2									1			3	
NOLOGY OF	BFOTD1-513				-	C04	CO.4 Creating awareness about factors affecting the storage of fats and oils from the safety point of view.						3									2
TECHI					-	500	CO.5Understanding of various modification methods of fats and oils toimprove their physic-chemical properties.							2		2			2			
AX S						001	CO.1 Imparting knowledge about physic-chemical properties of fats and oils.	3											3			
D FATS LAB						C02	CO.2Understanding of adulteration in fats and oils.	3					2						2			
TECHNOLOGY OF OILS AND FATS LAB XV	BFOTD1-514	5	2	30	004	03	CO.3 Evaluation of organoleptic properties of fats and oils for theirappropriate use in food products.			2				1							2	
TECHNOLO	BFOTE				-	CO4	CO.4 Analysis of quality parameters of fats and oils to ensure their safety for human consumption.		3			2									3	
					-	502	CO.5Understanding of various processing methods used at industrialscale.							2		2						1
						001	CO.1Familiarize students with the basic concepts of food engineering including units and dimensions	3											3			
NEERING	1-601	C	4	60	01	C02	cO.2 Understanding the basic principles, processes and components of material and energy balances						2						3			
FOOD ENGINE	BFOTS1	6	4	60	310	CO3	CO.3Providing the knowledge about thermodynamic system and its different properties	2				1							3			
						CO4	CO.4 Aware students about principles of fluid flow and its effect in food processing.											2		1		

						500	CO.5 Interpretation of data using psychrometry and synthesis of information for developing appropriate		2		2									2
							storage and processing conditions.													
						001	CO.1 Understanding the concepts of relationship between food, nutrition andhealth.	3									3			
NO	02	6	4	60		CO2	CO.2Aware students about various nutrients, their classifications and functions associated with the human health.		3							1	3			
FOOD AND NUTRITION	BFOTS1-602				310	CO3	CO.3Familiarize students with the concept of RDA and its importance in maintaining the health.						1		2				2	
FOOD AN						C04	CO.4 Imparting the knowledge of importance of meal planning in diet for different group of people.					3						2		
						CO5	CO.5 To create the awareness about FSSAI guidelines used for nutritional labelling in India.	1				2							3	
						CO1	CO.1 Aware students about structure and functions of taste organs.	3									3			
: FOOD					-	C02	CO.2Providing the knowledge about taste measurements and taste abnormalities						2		1					2
SENSORY EVALUATION OF FOOD	BFOTD1-611	6	4	60	400	CO3	CO.3 Familiarize the students with the importance of odour, flavor and colour insensory evaluation of food.			3								1		
ENSORY EVA	BF					CO4	CO.4 Understanding the importance of texture and texture perception in food.				3						2			
35						02	CO.5 Application of different types of equipment used for sensory evaluation of food.				3								3	
N OF AB-XVI	12					C01	CO.1 Creating awareness among students about the importance of sensory panel.	3									3			
SENSORY EVALUATION O FOOD LAB	BFOTD1-612	6	2	30	004	C02	CO.2 Provide practical knowledge of various sensory tests.			2									2	
SENSORY E	В					CO3	CO.3 Conducting various tests for sensory evaluation of different foodproducts.				2								2	

	-			1	1 1		Lague III .		1	1				-	-	. 1		1		1	
						004	CO.4 Familiarize students with various quality tests for milk products, cereals and confectionary products.						2			I					3
						500	CO.5 Imparting the knowledge about qualitative tests for various oils and fats					3									3
						001	CO.1 Provide knowledge about concepts of designing and importance of a good layout.	2										3			
		6	4	60		C02	CO.2 Imparting the knowledge about importance of plant site and location factors.		2										2		
FOOD PLANT LAYOUT	BFUIDI-613				400	03	CO.3 Familiarize the students about the selection of plant building material and equipment's.					2									2
FOOD PLAI	ВЕОП					CO4	CO.4 Creating the awareness about layout symbols among students.						2			1			1		
						500	CO5. Creating awareness regarding layout symbols									2				2	
						C01	CO.1 Preparing the layouts for different processing plants.	2												1	
II.	+	4	2	30		C02	CO.2 Familiarizing the students about process diagrams of various manufacturing units.										2	3			
OUT LAB X	BFO1DI-614	7	۷	30	004	CO3	CO.3 Imparting the knowledge about calculations related to processing cost.	2					1								2
FOOD PLANT LAYOUT LAB XVII	BF(C04	CO.4 Creating the awareness among students about the processes to calculate the life of various machines and equipments in the plant.	2			1							1			
96						CO5	CO.5 Synthesize the information about the shelf life estimation of various machines.					2								2	
AFETY	1-621				0	C01	CO.1 Aware students about food safety and importance of food safety.	3										3			
FOOD SAFETY	BFOTD1-621	6	4	60	400	C02	CO.2 Understanding the concept of Hygiene and Sanitation in Food Service Establishments and their association with food safety.	2					1					2			

						CO3	CO.3 Familiarize the students about various food hazards and its impact onhealth.								1				3	
					•	C04	CO.4 Providing knowledge about food safety tools and their need for food quality.		1				2							3
						502	CO.5 Imparting the knowledge about different food safety laws.			1		2						2		
						CO1	CO.1 Performing various tests for preparation of selective and complexmedia.	3												2
g g						C02	CO.2 Creating the ability of handling tools for microbiological tests.				3						2			
FOOD SAFETY LAB	BFOTD1-622	6	2	30	004	CO3	CO.3 Imparting the knowledge about different methods of staining and its usein food safety.		3									1		
F00I	BFC					CO4	CO.4 Aware students about the importance of personal hygiene and its assessment.			2									2	
						500	CO.5 Familiarize the students about detection of physical and chemical hazard in food.	2					2							3
						001	CO.1 Aware students about quality concepts, quality perception, qualityattributes of foods.					2	1							3
ENT						C02	CO.2 Familiarize students to the concepts of quality management	3									3			
ALITY MANAGEMENT	BFOTD1-623	6	4	60	400	CO3	CO.3 Imparting the knowledge about food contamination, heavy metals, pesticide residues, antibiotics, agrochemicals, veterinary drug residues, environmental pollutants.	1			2						3			
FOOD QUA						C04	CO.4 Understanding the need of foodadditives in food processing and preservation.			3									2	
						CO5	CO.5 Providing the knowledge of various freezing methods used in foodindustries.		2								3			
FOOD	BFO1D 1-624	4	2	30	004	01	CO.1 Understanding the concept of qualitative analysis of various milkproducts.	2				1					3			

						C02	CO.2 Familiarize students with quality inspection of cereals, pulses and				2											3
						<u> </u>	spices. CO.3 Creating the ability to determine	2		1										1		
						CO3	various contaminants in water.	2		1										1		
					-	CO4	CO.4 Providing a platform for quality testing of various food products.					3									3	
						CO5	CO.5 Imparting the knowledge about insecticides and heavy metals present infood.		3										3			
9I						C01	CO1. Familiarize students with the importance of scientific storage systems	3											3			
SINEERIN	1					C02	CO2. Understanding various post-harvest changes and causes of spoilage in fruits and grains						2									2
AGE ENC	BFOTS1-701	7	4	60	400	03	CO3. Providing knowledge about various storage structures	3											3			
FOOD STORAGE ENGINEERING	B				-	C04	CO4. Creating awareness amongst students about prevention of fruits and grains from insects and pests							2		3			2			
FC					-	502	CO5. Understanding the design of storage structures and various specifications for designs of storage systems						3								2	
						001	CO1. Imparting knowledge about basics of food biotechnology	3											3			
AOLOGY	22				-		CO2. Creating the awareness about different toxins and various naturals antimicrobial agents used in food preservation							2		2						2
FOOD BIOTECHNOLOGY	BFOTS1-702	7	4	60	400	03	CO3. Remembering the concept of genetic engineering and its role in food production enhancement	3											3			
FOOD E	B					CO4	CO4. Understanding the methods and applications of protein engineering in food technology						2								2	
						500	CO5. Analyzing the role of Intellectual property rights (IPR) in biotechnology and their associated benefits							1			2	1				2

						CO1	CO1. Imparting the knowledge of types and importance of beverages	3									3			
VERAGES						005	CO2. Understanding the technology behind processing of different beverages to meet the legal specifications			3		2							3	
TECHNOLOGY OF BEVERAGES	BFOTS1-703	7	4	60	400	603	CO3. Familiarize with the concept of water treatment along with quality parameters involved	3				1								2
CHNOLO	BF					C04	CO4. Application of different types of additives to address the specified needs of consumers			1			2						3	
#						502	CO5. Creating awareness regarding quality control tests used in beverages								3					3
LOGY						001	CO1. Imparting knowledge about compositions, formulations and quality testing of Snack foods	3									3			
EXTRUSION TECHNOLOGY	4						CO2. Creating awareness aware about specifications, composition, ingredients, processing techniques of breakfast cereals and texturized vegetable protein					2			3				3	
KTRUSION	BFOTS1-704	7	4	60	400	03	CO3. Familiarizing with different types of extruders	3									3			
SNACKS AND EX	В					C04	CO4. Understanding manufacturing of different extruded products			3									2	
SNACK						500	CO5. Analyzing the chemical and nutritional changes in food during extrusion		2											2
.AB						001	CO1. Imparting knowledge regarding quality analysis of water	3												2
VERAGES LAB	05					CO2	CO2. Understanding the technology behind processing of different types of beverages			2							3			
Y OF BEV	FOTS1-70	7	4	60	004	03	CO3. Familiarize with the methods involved in determination of different additives used in the formulation of beverages	3		2							3			
TECHNOLOGY OF BEV	BF					CO4	CO4. Analysis of quality parameters of beverages so as to meet the legal specifications					3							3	
TEC						502	CO5. Understanding the mode of working in industrial setups as an individual and as a team							3		2		3		

				60		C01	CO1. Understanding of identifications and composition of various ingredients used for manufacturing of snacks and extruded products	3									3		
	902				004	02	CO2. Imparting knowledge about testing of different raw materials used in preparation of snacks and extruded products				1	1							2
	BFOTS1-70	7	2				CO3. Development of different snack food products and extruded products			3								3	
	В					CO4	CO4. Familiarizing with different tests to quality evaluation of extruded products		3			2							3
							CO5. Creating awareness about packaging of snack food products and extruded products						2		2		3		

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

1. Slight (Low) - upto 30%

2. Moderate (Medium) – above 30% and upto70%

3. Substantial (High) – above 70%