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

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

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

COURSE ARTICULATION MATRIX (STUDY SCHEME: 2018)

Subject	S Code	Semester	Credit	Duration (Hrs)	L T P	COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
Principles of Food Preservation	MFOT1-101	1	4	60	4 0 0	CO1	CO1 Imparting knowledge on the causes of food spoilage and principles of food preservation	3	0	0	0	0	2	0	0	0	0	0	0	1			
						CO2	**CO2** Understanding the applications of basic and advanced equipments used for food preservation	0	0	0	0	3	0	0	0	0	0	0	0			3	
						CO3	CO3 Creating the awareness about limits of chemical preservatives safe for human consumption.	0	0	0	0	0	3	0	0	0	2	0	0				3
						CO4	CO4 Analyzing the effectiveness of novel preservation techniques over traditional methods with respect to food and environment.	0	0	2	0	0	0	1	0	0	0	0	0		2		
Basic Food	MFOT1-102	1	4	60	4 0 0	CO1	CO1 Applying the knowledge of HACCP and food safety to prevent the growth of microbes in foods.	2	0	0	0	0	3	0	0	0	0	0	0	1		1	

						CO2	CO2 Detection of food borne pathogens using novel techniques of analysis	0	0	0	0	2	2	0	0	0	0	0	0			2	
						CO3	CO3 Evaluating the factors encouraging and restricting the growth of microbes in foods	0	0	0	0	0	2	0	0	0	0	0	0	1		1	
						CO4	CO4 Analyzing the role of pathogens in food borne illnesses	0	0	0	0	0	2	0	0	0	0	0	0		2		1
Food Chemistry	MFOT1-103	1	4	60	4 0 0	CO1	CO1 Imparting the knowledge of chemical composition of food.	3	0	0	0	0	0	0	0	0	0	0	0	3			
						CO2	CO2 Understanding the harmful effects of allergens and toxic constituents of foods on human health.	0	0	0	0	0	3	0	0	0	0	0	0		3		
						CO3	CO3 Analysing the factors affecting nutritional composition of food.	0	1	0	0	0	2	0	0	0	0	0	0				2
						CO4	CO4 Evaluating the processes leading to desirable and undesirable changes occurring in food	0	0	3	0	0	2	0	0	0	0	0	0			2	
Food Analysis and Instrumentation Lab-I	MFOT1-104	1	2	30	0 0 4	CO1	CO1 Understanding the nutritional composition of food	3	0	0	0	0	2	0	0	0	0	0	0	3			
						CO2	CO2 Application of novel techniques in food analysis	0	0	0	0	3	0	0	0	0	0	0	0			2	
						CO3	CO3 Evaluating the quality parameters of food products to ensure food safety and public health	0	0	0	0	1	3	0	0	0	0	0	0		3		
						CO4	CO4 Analysis of proximate composition of food products	0	0	0	0	1	2	0	0	0	0	0	0				3
Food Microbiology Lab-II	MFOT1-105	1	2	30	0 0 4	CO1	CO1 Imparting the knowledge of media preparation, staining methods and handling practices	3	0	0	0	1	0	0	0	0	0	0	0	3			
						CO2	CO2 Application of microbial tools and techniques for detection of spoilage microorganisms	0	0	0	0	3	1	0	0	0	0	0	0			3	
						CO3	CO3 Analyzing the microbial load of different food products to determine their safety for human consumption.	0	0	0	0	0	3	0	0	0	0	0	0		3		

						CO4	CO4 Evaluating the growth curve of microbes in relation to its effect on food quality.	0	3	0	1	0	0	0	0	0	0	0	0		1	1	1
Nutraceutical and Functional Foods	MFOT1-156	1	4	60	400	CO1	CO1 Imparting the knowledge of nature, types, and scope of nutraceutical and functional foods.	3	0	0	0	0	0	0	0	0	0	0	0	2			
						CO2	CO2 Application of nutraceutical and functional foods for the treatment of various disorders	0	0	0	0	0	3	0	0	0	0	0	0		2		
						CO3	CO3 Creating the ability of effective communication with society regarding therapeutical effects of nutraceutical and functional foods.	0	0	0	0	0	2	0	0	0	3	0	0				3
						CO4	CO4 Evaluating the functionality of nutraceutical compounds with respect to their stability and shelf life	0	0	1	0	0	1	0	0	0	0	0	0			2	
Nutrition and Health	MFOT1-157	1	4	60	400	CO1	CO1 Imparting knowledge about basic terminology of nutrition and different functions of food.	3	0	0	0	0	2	0	0	0	0	0	0	2			
						CO2	CO2 Application and role of foods to address various health issues.	3	0	0	0	0	0	0	0	0	0	0	0		3		
						CO3	CO3 Creating the awareness regarding social, cultural and physiological aspects of foods.	0	0	0	0	0	3	0	0	0	1	0	0				2
						CO4	CO4 Analyzing the nutritional requirements for different age groups.	0	1	0	0	0	3	0	0	0	0	0	0				2
Basic Food Engineering	MFOT1-206	2	4	60	400	CO1	CO1 Imparting the knowledge about fundamental concepts of food engineering.	3	0	0	0	0	0	0	0	0	0	0	0	2			
						CO2	CO2 Understanding the principles of food engineering for efficient utilization of finance and project management in food industry.	0	2	0	0	0	0	0	0	0	0	3	0				1
						CO3	CO3 Analysis of problems related to commercial sterilization of food products.	0	3	0	0	0	1	0	0	0	0	0	0			2	
						CO4	CO4 Interpretation of data using psychrometry and synthesis of information for developing appropriate storage and processing conditions.	0	0	0	3	0	0	0	0	0	0	1	0			1	

Technology of Cereals and Millets	MFOT1-207	2	4	60	400	CO1	CO1 Imparting the knowledge of structure and chemical composition of different cereal grains.	3	0	0	0	0	1	0	0	0	0	0	0	2			
						CO2	CO2 Application of techniques and machineries for the quality assessment of cereal grains and their products.	0	0	0	0	3	0	0	0	0	0	0	0			3	
						CO3	CO3 Analyzing the role of ingredients in development of food products from different cereal grains.	0	0	3	0	0	0	0	0	0	0	0	0	1			
						CO4	CO4 Understanding the utilization of by-products of milling and formulation of convenience foods for sustainable development.	0	0	0	0	0	0	3	0	0	0	0	0		1	2	
Computer Fundamentals and Statistics	MFOT1-208	2	4	60	400	CO1	CO1 Imparting the basic knowledge of computer, number system and computer networks.	3	0	0	0	0	0	0	0	0	0	0	0	2			
						CO2	CO2 Application of software packages for making reports, documents and effective presentations.	0	0	0	0	0	0	0	0	0	3	0	0	2			
						CO3	CO3 Analysis and interpretation of data using statistical techniques.	0	0	0	3	0	0	0	0	0	0	0	0			1	
						CO4	CO4 Understanding the types and functions of different hardware and software devices for better project management	2	0	0	0	0	0	0	0	0	0	3	0		1		
Technology of Cereals and Millets Lab – III	MFOT1-209	2	2	30	004	CO1	CO1 Imparting knowledge of proximate composition of flours from different cereal grains.	3	0	0	0	0	1	0	0	0	0	0	0	3			
						CO2	CO2 Understanding the mode of working in industrial setup as an individual and as a team.	0	0	0	0	0	0	0	0	3	0	0	0		2		
						CO3	CO3 Evaluation of different properties of cereal starches using modern techniques.	0	0	0	0	3	0	0	0	0	0	0	0			3	
						CO4	CO4 Analysis of quality attributes of cereal grains so as to meet legal specifications.	0	0	0	0	0	3	0	0	0	0	0	0		1	1	2
Technology of Beverages	MFOT1-258	2	4	60	400	CO1	CO1 Imparting the knowledge of types and importance of beverages.	3	0	0	0	0	2	0	0	0	0	0	0	2			
						CO2	CO2 Understanding the technology behind processing of different beverages to meet the legal specifications.	0	0	0	0	2	2	0	0	0	0	0	0			1	

						CO3	CO3 Application of low calorie sweeteners for preparation of beverages to address the specified needs of consumers.	0	0	2	0	0	2	0	0	0	0	0	0				2
						CO4	CO4 Creating awareness to communicate regarding safety levels of additives used in beverage preparation along with quality standards of bottled water.	0	0	0	0	0	2	0	0	0	3	0	0			1	2
TECHNOLOGY OF MALTING AND BREWING	MFOT1-259	2	4	60	400	CO1	CO1 Imparting the basic knowledge of production, trade, structure and composition of barley.	3	0	0	0	0	2	0	0	0	0	1	0	2			
						CO2	CO2 Application of malt for development of different food products.	0	0	3	0	0	0	0	0	0	0	0	0			2	
						CO3	CO3 Quality evaluation of ingredients involved in production of beer.	0	0	0	0	2	1	0	0	0	0	0	0			3	
						CO4	CO4 Understanding the techniques involved in processing and quality assessment of beer.	0	0	0	0	3	1	0	0	0	0	0	0				3
FOOD BIOTECHNOLOGY	MFOT1-259	2	4	60	400	CO1	CO1 Imparting the knowledge of basic principles of genetic engineering with respect to food.	3	0	0	0	0	0	0	0	0	0	0	0	3			
						CO2	CO2 Understanding the applications of bacteriocins in food systems along with their safety levels.	0	0	0	0	0	3	0	0	0	0	0	0		3		
						CO3	CO3 Creating awareness of bioethics in food biotechnology.	0	0	0	0	0	0	0	3	0	1	0	0		2		
						CO4	CO4 Application of novel processes and techniques for improvement in various foods.	0	0	3	0	0	1	0	0	0	0	0	0			3	2
FOOD ADDITIVES	MFOT1-260	2	4	60	400	CO1	CO1 Imparting knowledge of types and functions of different food additives.	3	0	0	0	0	2	0	0	0	0	0	0	3			
						CO2	CO2 Understanding the limitations of application of food additives in food products.	0	0	0	0	1	2	0	0	0	0	0	0		3		
						CO3	CO3 Creating awareness regarding use of food additives and their permissible limits.	0	0	0	0	0	3	0	0	0	1	0	0		2	2	
						CO4	CO4 Applications of recent advances in additives in context to different food attributes.	0	0	2	0	1	0	0	0	0	0	0	0				1

TECHNOLOGY OF FRUITS AND VEGETABLES	MFOT1-310	3	4	60	400	CO1	CO1 Imparting knowledge about classification and nutritional value of fruits and vegetable.	3	0	0	0	0	2	0	0	0	0	0	0	3			
						CO2	CO2 Application of appropriate techniques and modern machineries for the production of quality products from fruits and vegetable.	0	0	0	0	3	2	0	0	0	0	0	0			3	
						CO3	CO3 Creating awareness about spoilage in fruits and vegetables to avoid the occurrence of food borne illnesses.	0	0	0	0	0	3	0	0	0	2	0	0		3		
						CO4	CO4 Development and utilization of by products from fruits and vegetables waste to address the environmental concerns.	0	0	1	0	0	0	3	0	0	0	0	0		3	2	
UNIT OPERATIONS IN FOOD ENGINEERING	MFOT1-311	3	4	60	400	CO1	CO1 Imparting knowledge of preliminary unit operations.	3	0	0	0	0	0	0	0	0	0	0	0	3			
						CO2	CO2 Understanding the principles of food engineering and apply these to manage the projects ijn industrial set ups.	0	0	0	0	0	0	0	0	0	0	2	0		2		
						CO3	CO3 Creating awareness regarding selection and application of tools and techniques used for the production and storage of foods.	0	0	0	0	3	0	0	0	0	1	0	0			3	
						CO4	CO4 Formulate and analyze the complex problems of unit operations used in food engineering	0	3	0	1	0	0	0	0	0	0	0	0				2
TECHNOLOGY OF FRUITS AND VEGETABLES LAB – IV	MFOT1-313	3	2	30	004	CO1	CO1 Imparting knowledge regarding extraction of juices and preparation of products from fruits and vegetables.	3	0	0	0	0	2	0	0	0	0	0	0			2	
						CO2	CO2 Creating awareness about quality assessment of products for production of quality food.	0	0	0	0	0	3	0	0	0	1	0	0			2	
						CO3	CO3 Analyzing the microbiological parameters of the products to meet the safety standards.	0	0	0	0	0	3	0	0	0	0	0	0		2		
						CO4	CO4 Evaluating the cost of food products for better management of finance in one's own work and industrial set ups.	0	0	0	0	0	0	0	0	0	0	3	0		1	2	
FOOD PACKAGING LAB – V	MFOT1-314	3	2	30	004	CO1	CO1 Identification of different packaging materials as per the requirements of food products using principles of food packaging.	3	0	0	0	0	0	0	0	0	0	0	0	1			
						CO2	CO2 Understanding the application of novel food packaging techniques.	0	0	0	0	3	0	0	0	0	0	0	0		2	1	

						CO3	CO3 Evaluating the quality of packaged food products so as to provide safe food for consumption.	0	0	0	0	2	3	0	0	0	0	0	0			2	
						CO4	CO4 Analyzing the physical parameters of packaging materials to meet the legal specifications.	0	0	0	0	0	2	0	0	0	0	0	0		1	2	
FOOD STANDARDS AND QUALITY ASSURANCE	MFOT1-362	3	3	45	300	CO1	CO1 Imparting knowledge of concepts of food quality and assurance.	3	0	0	0	0	2	0	0	0	0	0	0	3			
						CO2	CO2 Understanding the laws and regulation in relations to food quality and safety.	0	0	0	0	0	3	0	0	0	0	0	0		3		
						CO3	CO3 Applications of good hygiene and good laboratory practices with respect to environmental considerations.	0	0	0	0	0	0	3	0	0	0	1	0		2		
						CO4	CO4 Creating awareness about various sampling techniques and analysis of data using statistical quality control	0	3	0	0	0	0	0	0	0	1	0	0	1			
TECHNOLOGY OF PULSES AND OILSEEDS	MFOT1-363	3	3	45	300	CO1	CO1 Imparting knowledge about importance of fats and oils in human nutrition.	3	0	0	0	0	2	0	0	0	0	0	0	1			2
						CO2	CO2 Understanding the importance of oilseed processing and applying these to one's own work and in industrial setups.	0	0	0	0	0	0	0	0	0	0	3	0		1	2	
						CO3	CO3 Creating awareness about selection and application of techniques and machineries in milling and extraction processes.	0	0	0	0	3	0	0	0	0	1	0	0			3	
						CO4	CO4 Demonstrating knowledge about anti-nutritional factors and their modes of elimination so as to ensure public health.	3	0	0	0	0	3	0	0	0	0	0	0		2		2
TECHNOLOGY OF EGG, MEAT, FISH AND POULTRY	MFOT1-415	4	4	60	400	CO1	CO1 Imparting knowledge about composition and nutritional value of meat, fish and poultry.	3	0	0	0	0	2	0	0	0	0	0	0	3			
						CO2	CO2 Applying ethical principles in various practices involved in slaughtering of animals.	0	0	0	0	1	0	0	3	0	0	0	0	1			
						CO3	CO3 Evaluation of internal and external quality parameters of egg to ensure safety for consumption.	0	0	0	0	2	0	0	0	0	0	0	0		3	3	
						CO4	CO4 Creating awareness regarding utilization of by products from meat industry in context to environment.	1	0	0	0	0	0	3	0	0	0	0	0		2		

TECHNOLOGY OF MILK AND MILK PRODUCTS	MFOT1-416	4	4	60	400	CO1	CO1 Imparting knowledge about composition, nutritive value and processing of milk and milk products.	3	0	0	0	0	2	0	0	0	0	0	0	3			
						CO2	CO2 Understanding the microbiological quality of fresh milk to ensure its safety for human consumption and processing.	0	0	0	0	0	3	0	0	0	0	0	0		2	2	
						CO3	CO3 Cost effective utilization of by-products of dairy industry to address the environmental concerns.	0	0	0	0	0	0	2	0	0	0	3	0			2	
						CO4	CO4 Creating awareness about scope, strengths and opportunities of dairy industry and its implementation to become entrepreneur.	0	0	0	0	0	0	0	0	0	2	3	0		1		
FOOD ANALYSIS AND INSTRUMENTATION	MFOT1-417	4	3	45	300	CO1	CO1 Imparting knowledge about proximate analysis of food products.	3	0	0	0	1	0	0	0	0	0	0	0	1		2	
						CO2	CO2 Understanding the selection and application of appropriate modern techniques for quality assessment of foods.	0	0	0	0	3	0	0	0	0	0	0	0			1	
						CO3	CO3 Creating awareness regarding sampling techniques, statistical analysis and interpretation of data along with expression of results.	0	3	0	3	0	0	0	0	0	1	0	0	1			
						CO4	CO4 Application of novel methodologies for microbial load analysis of food to ensure safety for consumption	0	0	0	0	3	2	0	0	0	0	0	0		2	1	
TECHNOLOGY OF ANIMAL PRODUCTS LAB-VI	MFOT1-418	4	2	30	004	CO1	CO1 Imparting knowledge development of various processed foods from animal products.	3	0	2	0	0	0	0	0	0	0	0	0	1			
						CO2	CO2 Understanding the mode of working in industrial setup as an individual and as a team.	0	0	0	0	0	0	0	0	3	0	0	0		1		1
						CO3	CO3 Evaluation of microbiological quality of milk and milk products to ensure their safety for consumption.	0	0	0	0	3	2	0	0	0	0	0	0			3	
						CO4	CO4 Analysis of quality parameters of animal products so as to meet the legal specifications	0	0	0	0	3	2	0	0	0	0	0	0		1	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%