

Semester	5		
Course Code:	MIBI 31514		
Course Name:	Food Microbiology and Food Hygiene, Microbiology of Food Processing and Preservation		
Credit Value:	4		
Core/Optional	Core		
Hourly Breakdown	Theory	Practical	Independent Learning
	60 hrs	-	140 hrs
Course Aim/Intended Learning Outcomes:			
<p>Upon successful completion of this course student will be able to;</p> <ul style="list-style-type: none"> Identify the spoilage and pathogenic flora in different categories of fresh foods and processed foods, Identify the physical, chemical and biological conditions under which the important pathogens and spoilage microorganisms are inactivated or killed, Understand the beneficial role of microorganisms in foods, Understand the importance of prevention of food borne diseases, Apply food quality management systems to maintain food safety and food hygiene in industries and other relevant areas, Describe the relationship of microbiology to food processing and preservation, Understand the importance of identifying the correct stage of maturity in harvesting plant products, Describe principles of food preservation and food processing methods widely used in the food industry, Select, propose, determine appropriate food preservation technique for a particular food product, Analyze food preservation process for the efficacy, Describe different fermentation processes used in the food industry Identify the plant food groups and explain the importance of preserving them in industrial scale, Identify and describe the unit operations in the food Industry to manufacture different types of food, Describe the technology of processing the major value-added products of different food groups and Identify the importance of sensory evaluation in development and value addition of the different foods. 			
Course Content:			
Food Microbiology:			
<p>Introduction. Intrinsic and extrinsic factors that influence the microbial growth in foods, Sources that contaminate food, Microbial flora of fresh foods, <i>Food spoilage</i>: Physical, chemical and biological hazards, Physical and chemical changes taking place during food spoilage, Spoilage microorganisms in different types of processed food, significance of spore forming bacteria in food spoilage. Microbiological aspects of chemical, physical and biological food preservative methods, Genetically Modified Food.</p> <p><i>Beneficial microorganisms in food industry</i>: Microorganisms used in food production, Microorganisms as food, Functional foods and Probiotics. Food allergy. Food toxicity. <i>Food borne diseases</i>: Bacterial, fungal and viral diseases, Food borne outbreaks, Microbiological risk analysis. Methods used to identify microorganisms in food samples. Microbiological analysis of food and drinking water based on SLS standards. Food packaging systems. Importance of food quality assurance. International and local organizations dealing with food hygiene and food safety. Current Food hygiene related legislations. Pre-requisite programmes: GMPs, SSOPs, Quality management processes: HACCP, ISO 22000; WHO five key system, Competence of testing and calibration of laboratories: ISO 17025.</p>			
Microbiology of Food Processing and Preservation:			
<p><i>Post-harvest technology</i>: Causes for post harvest losses, Importance of food technology in reducing the post harvest losses, Importance of determining maturity indices and its effect on post harvest handling, storage and transport on quality of raw material.</p> <p><i>Introduction to food preservation and its importance</i>: Different types of food preservation techniques. <i>Control of access of microorganisms</i>: cleaning, sanitation, disinfection. <i>Physical removal</i>: trimming, washing, centrifugation, filtration. <i>Thermal (high temperature) preservation of foods</i>: Blanching, Thermization, Pasteurization, Sterilization. <i>Low temperature preservation</i>: Chilling/refrigeration, Freezing. <i>Reduced water activity</i>: Osmotic dehydration, Drying. Modified atmosphere/Controlled atmosphere. Preserving by using chemicals. Irradiation. Preservation through novel processing technologies. Combination of methods (Hurdle Concept). <i>Fermented food production</i>: General method of production, Fermented dairy products, Fermented meat products.</p>			

Processing of plant products in industrial scale: Fruits and vegetables - major fruits, nutritional value, Microbial applications for minimal processing, Modified and control Atmosphere, Drying/dehydration, Osmotic dehydration, Processing /preservation by using chemicals, Pasteurization, Sterilization/canning, UHT processing. Cereals - major cereals, nutritional value. Harvest, Cleaning, Drying, Storage, Decorticating, Dehusking, dehulling, Milling, Parboiling, Microbial applications of canning
Extrusion cooking technology, Bakery technology: Functions of raw materials used in baking, role of microorganism in bakery industry, Importance of Gluten - bread making technology, value-added products, major reactions in bakery products. *Sensory evaluation of foods:* Nature of food and sensory perception, Sensory quality evaluation, Selection of sensory panel, Sensory tests methods and descriptive analytical methods, Statistics in sensory testing. Measurement of the sensory characteristics for quality assurance, product development and optimization

Teaching /Learning Methods:

A combination of lectures, assignments, small group discussions/ presentations and factory visits

Assessment Strategy: End of the course unit examination

Continuous Assessment 0%	Final Assessment 100%		
Details: N/A	Theory (%) 100	Practical (%) -	Other (%) -

Recommended Reading:

- Jay, J. M., Loessner, M.J. and Golden, D.A., (2005) *Modern Food Microbiology*, 7th edition, Springer publication.
- Mortimore, S. and Wallace, C. (2013) *HACCP: A Practical Approach*. Springer Publications
- Relevant SLS and ISO standards.
- Potter, N. N. and Hotchkiss, J.H. (1995) *Food Science*. 5th edition. Springer US.
- Nielsen, S. (2017) *Food Analysis*. 5th Ed. Springer International Publishing.
- Rahman, M.S. (1999) *Handbook of food preservation*.