Title of the Course: FOOD MICROBIOLOGY [T]

Course Code: MIC-625

Number of Credits: 3, Theory

Contact hours: 45

Effective from Academic Year: 2022-23

Prerequisites	It is assumed that students know the nutritional quality of food to microorganisms and presence and types of different microorganisms in the food.	
Objective:	• Student will understand the beneficial and harmful association of microorganisms with the food. • Student will learn prospective applications of the microorganisms in food industry. • Student will learn the different methods of controlling the type and number of microorganisms in the food as per requirement. • Student will gain the knowledge about the role of food regulatory bodies and measures of food safety and quality control.	
Content:		
1.	**Microbial Food Spoilage and Food Preservation**	**(15)**
A.	Predictive food microbiology - Types of foods and their spoilage.	**4**
B.	Factors affecting the growth and survival of microorganisms in foods: Intrinsic, Extrinsic.	**4**
C.	Preservation methods: Heat processing, low temperature storage, control of water activity, irradiation, high pressure processing, modified atmospheres, preservatives: chemicals, natural organic molecules (nisin).	**7**
2.	**Microbiology in Food Processes**	**(15)**
2.1	**Fermented and processed foods**	**11**
A.	Indian fermented foods.	
B.	Oriental mold modified foods.	
C.	Fermented meats and fish: - sausage, fish sauce.	
D.	Fermentations: wine, vinegar.	
2.2	**Genetically engineered microorganisms in the Food Industry**	**4**
A.	Concept, advancements, principles.	
B.	Role of genetically engineered microbes in the food industry.	
3.	**Food Safety and Quality Assurance**	**(15)**
3.1	**Food borne diseases**	**5**
	Bacterial, with emphasis on emerging pathogens such as *E. coli* EHEC O157:H7 and other strains; *L. monocytogenes*, *H. pylori*; Fungal, Algal, Viral, Prions and other non-bacterial forms.	
3.2	**Quality control and Validation**	**10**
A.	Microbiological examination of foods – sampling, culturing/analysis including newer methods such as PCR, magnetic separation.	

B.	Plant sanitation.	
C.	Hazard Analysis and Critical Control Point (HACCP) concept.	
D.	Food Safety Act and Trade Regulations.	
E.	Good Manufacturing Practice (GMP) and Quality Systems.	
Pedagogy:	Lectures/tutorials/assignments	
References/ Readings	Adams, M. R. and Moss, M. O., Food Microbiology, New Age International (P) Limited Publishers, New Delhi. (2008)	
	Bacteriological Analytical Manual (BAM), US FDA Administration, https://www.fda.gov/food/laboratory-methods-food/bacteriological-analytical-manual-bam (2023)	
	Da Silva, N., Taniwaki, M. H., Junqueira, V. C. A., Silveira, N. F. A., Nascimento, M. S. do. and Gomes, R. A. R., Microbiological Examination Methods of Food and Water: A Laboratory Manual, CRC Press, Taylor & Francis Group, U.K. (2018).	
	Department of Food and Public Distribution, Ministry of Consumer Affairs, Food & Public Distributin, GOI https://dfpd.gov.in/index.htm (2023).	
	Doyle, M. P. and Buchanan, R. L., Food Microbiology: Fundamentals and Frontiers, ASM Press. (2012)	
	Food Safety and Standards Authority of India, Ministry of Healthand Family Welfare, GOI https://fssai.gov.in/cms/food-safety-and-standards-act-2006.php#:~:text=The%20Food%20Safety%20and%20Standards,34%20OF%202006. (2023)	
	Frazier, W. C. and Westhoff, D. C., Food Microbiology, M. C. Graw-Hill Companies, Inc., New York. (2020)	
	Harrigan, W. F., Laboratory Methods in food Microbiology, CRC Press, Taylor & Francis Group. (2020)	
	Jay, MJ, Loessner, M.J. & Golden, D.A., Modern Food Microbiology, Springer Science + Business Media Inc., NY. (2006)	
	Ramesh, K. V., Food Microbiology, MJP Publishers, Chennai. (2019).	
Course Outcomes	• Describe the beneficial and harmful association of microorganisms with the food. • Appraise the prospective applications of the microorganisms in food industry. • Select the different methods of controlling the type and number of microorganisms in the food for its preservation. • Integrate the knowledge about the role of food regulatory bodies and measures of food safety, quality control and validation.	