

LECTURE SCHEDULE

Department: Dairy Microbiology

Course No. - DTM-321

Course Title: Food and Industrial Microbiology Credit Hrs.-3 (2+1)

Course Teacher: Dr. Rakesh Kumar

Theory

S. No.	Topics to be covered	No. of Classes
1	Scope of food microbiology: Basic aspects, history and scope of food microbiology.	01
2	Important Sources of food contamination and Control of spoilage.	02
3	Intrinsic and extrinsic factors that affect microbial growth in different foods.	02
3	Microbial spoilage of fruits and fruit juices.	01
4	Microbial spoilage of vegetables and cereals.	01
5	Microbial spoilage of meat, poultry and sea foods.	01
6.	Microbial spoilage of carbonated soft drinks and canned foods.	01
7	Food preservation: Principles of food preservation: physical methods viz. low temperature.	01
8	Food preservation: Principles of food preservation: physical methods viz. high temperature preservation (D, Z and F Values) and Drying Methods.	02
9	Food preservation using Chemical preservatives and their mode of action on microbes.	01
10	Food preservation using Natural antimicrobial compounds and bio- preservation and their mode of action on microbes.	01
11	Fermentation processes: Historical development, components and types (i.e. submerged, surface and solid state fermentation).	02
12	Criteria for selection of industrially important microorganisms.	01
13	Preservation and improvement of industrially important micro-organisms using Metabolic engineering / Genetic engineering.	01
14	Media for industrial process; upstream and downstream processing.	01
15	Fermenters: types (batch, fed batch and continuous), Estimation of biomass; difference in chemostat and turbidostat.	02
16	Fermenters functions, design and control, sterilization process and growth rate analysis.	01
17	Estimation of biomass during industrial fermentation and difference in chemostat and turbidostat.	01
18	Microbial production of industrial products: Immobilization of enzymes / cells.	02
19	Microorganisms and processes involved in the production of single cell Protein.	01
20	Microorganisms and processes involved in the production of industrial alcohol, beer and wine.	02

21	Microorganisms and processes involved in the production of organic acids (citric and lactic).	01
22	Microorganisms and processes involved in the production of industrial alcohol, beer and wine.	02
23	Microorganisms and processes involved in the production of vitamin B ₁₂	01
24	Microorganisms and processes involved in the production of antibiotics and bacteriocins.	01
25	Microorganisms and processes involved in the production of enzymes (protease, lipase and rennet).	02
	Total	35

Practical (DTM-321)

S. No.	Practical to be covered	No. of Classes
1	Microbiological examination of fresh and canned fruits and juices.	01
2	Microbiological examination of fresh vegetables.	01
3	Microbiological examination of flour and bread.	01
4	Microbiological examination of eggs and meat.	01
5	Isolation of psychrophilic, salt and sugar tolerant microorganisms from foods.	01
6	Isolation of industrially important microorganisms from environment. Determination of Z, D and F values.	01
7	Production and assaying of microbial enzymes (protease/ lipase).	01
8	Production of lactic acid from whey.	01
9	Production of nisin and assaying the antimicrobial activity of the culture.	01
10	Design and control of a table-top and 10 liter lab fermenter (Demonstration).	01
11	Production of ethyl alcohol from molasses and whey by yeasts.	01
12	Production of fermented whey beverages.	01
13	Educational tour to food processing/ fermentation industries.	01
	Total	13