Second Year Third Semester

Course 3002 APPLIED MICROBIOBIOLOGY 45 Lectures, 3 credits

Objectives:

- To study and understand the role played by microorganisms in food spoilage, preservation & production.
- To evaluate the microbiological quality of milk, study preservation of milk, production of cheese.
- To understand the functioning of microbial industrial fermentations.

UNIT I : Food Microbiology (15 Lectures)

- Microbial Spoilage of Foods: Sources of microorganisms in foods, Factors affecting microbial growth in foods, Classification of foods by ease of spoilage, Types of spoilage
- Microbiological Examination of foods.
- Principles and methods of food preservation

  A. Inhibition principle: Reduction of aw, pH, Use of Preservatives, Low temperatures, smoking.

  B. Killing principle: Heat treatment (Canning, Pasteurisation, Sterilisation), Food Irradiation, Use of Gases.
- Food Borne Diseases: Food Infections vs Food Intoxications
- Microorganisms as food producers and as food amendments - Tabulation of fermented foods, Concept of probiotics and prebiotics.

UNIT II : Dairy Microbiology (15 Lectures)

- Composition of milk, Microbial Flora of milk, Desirable and Undesirable changes in milk by microorganisms
- Processing and analysis of Milk, Grading of Milk, Platform test, Dye reduction test, DMC, SPC, LPC, Thermoduric count, Psychrophilic count, Pasteurization, HTLT, LTHT and Phosphatase test., Sterilisation of milk
- Production of dairy products involving microorganisms: Varieties of cheeses, Yoghurt, Fermented milks, Butter
- Quality Management Systems in Dairy Industry

UNIT III : Industrial Microbiology (15 Lectures)

- Overview of an industrial fermentation process (Upstream, Downstream processing) Typical Flow chart of a representative process
- Design of a classical submerged aerobic fermenter, Functions of different components of the fermenter, Tabulation of different designs of fermenters with uses.
- Meanings of Terms of fermentations :(Batch, Continuous, Fed Batch, Static ,Submerged, Aerobic, Anaerobic, Solid State, Protected)
- Scale-up of a process, Scale–down of a process
- Continuous process improvement
- Important categories of industrial products using microorganisms (Primary and secondary metabolites, Biomass, Enzymes)

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