



GUJARAT UNIVERSITY
B.Sc. (Honors) Microbiology Syllabus (as per NEP)
Second Year B. Sc. Semester IV, Microbiology
Discipline Specific Course - Minor
Effective from June-2024

Paper Code: DSC-M-MIC-244T
Paper Name: Microbial Analysis of Food
Credits: 02 (02 hrs/ week, Total: 30 hrs)

Learning objectives:

- Describe how microorganisms interact with food substrates and influence fermentation, spoilage, and safety.
- Perform laboratory techniques for isolating, identifying, and quantifying microorganisms in food and dairy products.
- Assess the impact of microbial contamination on food safety and quality, including methods for detection and control.

Unit I Microbial Spoilage of Food

Teaching Hours: 15

- [A] Food as a substrate for microorganisms
- [B] Contamination of food from soil, water, air and during handling & processing
- [C] Microbial flora of food: Meats, Eggs, Fruits & Vegetables, Milk (biochemical, temperature and pathogenic types of microorganisms)
- [D] Factors affecting microbial growth in food: Intrinsic and Extrinsic
- [E] Microbial spoilage of food:
 - 1. Biochemical changes: Putrefaction, Fermentation, Rancidity
 - 2. Spoilage of fresh foods, fresh milk, canned foods

Unit II Food Infection and Poisoning

Teaching Hours: 15

- [A] Food infections:
 - Microorganism involved, source of infection, incubation period and characteristics in brief:
 - 1. Bacterial infections: *Salmonella* sp., *Shigella* sp, *Vibrio* sp., *Campylobacter jejuni*, *Listeria monocytogenes*
 - 2. Viral infections: Rotavirus, Hepatitis A, Poliovirus
 - 3. Protozoal infections: *Entamoeba*
- [B] Food poisoning:
 - 1. Bacteria as poisoning agent: *Staphylococcus aureus*, *Clostridium botulinum*
 - 2. Molds as poisoning agents: *Claviceps purpurea*, *Aspergillus flavus*, *Fusarium moniliformis*.
- [C] Microbiological examination of foods
 - 1. Generalized scheme for microbiological examination of foods
 - 2. Microscopic techniques
 - 3. Culture Techniques

Text Books:

1. Pelczar Jr, M J, Chan E C S, Krieg N R, (1986), Microbiology: An Application Based Approach, 5th edn. McGraw-Hill Book Company, NY
2. Frazier W C and Westhoff D C (2018), Food Microbiology, 5th edn. McGraw-Hill Book Company, NY, Adapted by N. M. Vanitha, with special emphasis on Food of Indian Origin.
3. Prescott L, Harley J P, and Klein D A, (2008), Microbiology, 7th edn. Wm C. Brown - McGraw Hill, Dubuque, IA.

B.Sc. (Honors) Microbiology Syllabus**B. Sc. Semester IV, Microbiology****Discipline Specific Course - Minor****Paper Code: DSC-M-MIC-244P****Paper Name: Microbiology Practicals****Credits: 02 (04 hrs/ week, Total: 60 hrs)****Microbial analysis of food and milk**

1. Standard plate count of food and milk sample
2. Determination of microbial load by use of MBRT of raw, boiled and pasteurized milk
3. Determination of microbial load by use of RRT of milk sample
4. Detection of Acid-fast bacteria in milk
5. Study of permanent slides: Acid fast bacteria, *Clostridium spp.*, *Fusarium spp.*, *Amoeba*, *Spirulina*