

B. Sc (CBCS) Industrial Microbiology – I Year
Semester-I
DSC: FUNDAMENTALS OF INDUSTRIAL MICROBIOLOGY

Theory syllabus

Credits – 4

UNIT – I

1. Definition and Scope of Microbiology, History and Development of Microbiology (contribution of pioneers), Golden Era of Microbiology.
2. The era of the discovery of antibiotics, The discovery of the Anaerobic life, The physiological significance of fermentation
3. Diversity of Microbial World, Prokaryotic cell, Structure of Bacterial cell, Archaeobacteria and Eubacteria.

UNIT - II

1. Structure and function of plasma membrane, cell wall, capsule, flagella, nucleoid, plasmid, Gram positive and Gram negative bacteria.
2. Definition of auxochrome; Chromophores; Acidic and Basic dyes; Classification of stains; Simple and differential staining: theories of staining, mordant and its function.
3. Gram staining; acid fast staining, endospore staining; negative staining; capsule staining, flagella staining; mechanism of gram staining.

UNIT – III

1. Sterilization and disinfection techniques - Principles and methods of sterilization. Physical methods - autoclave, hot-air oven, pressure cooker, laminar air flow, filter sterilization.
2. Radiation methods - UV rays, gamma rays, ultrasonic methods.
3. Chemical methods - Use of alcohols, aldehydes, fumigants, phenols, halogens and hypochlorites. Phenol coefficient.

UNIT – IV

1. Characteristics of Fungi, Algae, Protozoans, Viruses. Principles of classification of bacteria, algae, fungi, protozoa, viruses.
2. Methods for studying microorganisms, pure culture techniques, method, media – types, preservation techniques.
3. Microbial growth, phases of growth, conditions of growth, measurement of growth, bacterial sporulation and germination, binary fission.



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Practical syllabus

Credits - 1

1. Microbiology laboratory organization and safety precautions
2. To study the principle and applications of important instruments (biological safety cabinets, autoclave, incubator, BOD incubator, hot air oven, light microscope, pH meter) used in the microbiology laboratory.
3. Microscope and its handling
4. Micrometry - calibration of microscope and measurement of microorganisms (fungal spores).
5. Preparation of culture media – Czapek-Dox medium. PDA, Nutrient agar medium.
6. Demonstration of Motility by hanging drop method
7. Staining techniques :Simple staining, Gram's staining, staining of bacterial spores
8. Microscopic observation of bacteria (Gram +ve bacilli and cocci, Gram -ve bacilli and cocci), cyanobacteria (*Nostoc*, *Spirulina*), algae (*Scenedesmus* sp., diatoms), and fungi (*Saccharomyces*, *Rhizopus*, *Aspergillus*, *Penicillium*, *Fusarium*).

References:

1. Tortora GJ, Funke BR and Case CL. (2008). Microbiology: An Introduction. 9th edition. Pearson Education.
2. Madigan MT, Martinko JM, Dunlap PV and Clark DP. (2014). Brock Biology of Microorganisms. 14th edition. Pearson International Edition.
3. Wiley JM, Sherwood LM and Woolverton CJ. (2013) Prescott's Microbiology. 9th Edition. McGraw Hill International.
4. Atlas RM. (1997). Principles of Microbiology. 2nd edition. W.M.T.BrownPublishers.
5. Pelczar MJ, Chan ECS and Krieg NR. (1993). Microbiology. 5th edition. McGrawHill Book Company.
6. Stanier RY, Ingraham JL, Wheelis ML, and Painter PR. (2005). General Microbiology. 5th edition. McMillan.
7. General Microbiology (1993) Authors- Powar and Dagainawala.
8. Microbiology, Author- S.S. Purohit.
9. Microbiology, Author- P.D. Sharma







