

B.Sc. Microbiology (CBCS PATTERN) – Proposed curriculum  
**Semester-2**

MB-201 : INTRODUCTION TO BACTERIOLOGY (THEORY)

CREDITS: 4

TOTAL HOURS: 60

**Unit 1 Cell organization** No. of Hours: 20  
Cell size, shape and arrangement, glycocalyx, capsule, flagella, endoflagella, fimbriae and pili. Cell-wall: Composition and detailed structure of Gram-positive and Gram-negative cell walls, Archaeobacterial cell wall, Gram and acid fast staining mechanisms, lipopolysaccharide (LPS), sphaeroplasts, protoplasts, and L-forms. Effect of antibiotics and enzymes on the cell wall. Cell Membrane: Structure, function and chemical composition of bacterial and archaeal cell membranes. Cytoplasm: Ribosomes, mesosomes, inclusion bodies, nucleoid, chromosome and plasmids. Endospore: Structure, formation, stages of sporulation.

**Unit 2 Bacteriological techniques** No. of Hours: 15  
Pure culture isolation: Streaking, serial dilution and plating methods; cultivation, maintenance and preservation/stocking of pure cultures; cultivation of anaerobic bacteria, and accessing non-culturable bacteria.

**Unit 3 Growth and nutrition** No. of Hours: 15  
Nutritional requirements in bacteria and nutritional categories; Culture media: components of media, natural and synthetic media, chemically defined media, complex media, selective, differential, indicator, enriched and enrichment media

**Unit 4 Reproduction in Bacteria** No. of Hours: 10  
Asexual methods of reproduction, logarithmic representation of bacterial populations, phases of growth, calculation of generation time and specific growth rate

**SUGGESTED READINGS**

1. Atlas RM. (1997). Principles of Microbiology. 2nd edition. W.M.T. Brown Publishers.
2. Black JG. (2008). Microbiology: Principles and Explorations. 7th edition. Prentice Hall
3. Madigan MT, and Martinko JM. (2014). Brock Biology of Micro-organisms. 14<sup>th</sup> edition. Parker J., Prentice Hall International, Inc.
4. Pelczar Jr MJ, Chan ECS, and Krieg NR. (2004). Microbiology.. 5th edition Tata McGraw Hill.
5. Srivastava S and Srivastava PS. (2003). Understanding Bacteria. Kluwer Academic Publishers, Dordrecht
6. Slonier RY, Ingraham JL, Wheelis ML and Painter PR. (2005). General Microbiology. 5th edition McMillan.
7. Tortora GJ, Funke BR, and Case CL. (2008). Microbiology: An Introduction. 9<sup>th</sup> edition Pearson Education.
8. Miller JM, Sherwood LM, and Woolverton CJ. (2013). Prescott's Microbiology. 9<sup>th</sup> edition. McGraw Hill Higher Education.
9. Cappuccino J and Sherman N. (2010). Microbiology: A Laboratory Manual. 9th edition. Pearson Education Limited

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SEMESTER -2 (PRACTICALS)

TOTAL HOURS: 60

CREDITS: 2

1. Preparation of different media: synthetic media BG-11; Complex media-Nutrient agar, McConkey agar, EMB agar.
2. Simple staining
3. Negative staining
4. Gram's staining
5. Acid fast staining-permanent slide only. \*
6. Capsule staining
7. Endospore staining.
8. Isolation of pure cultures of bacteria by streaking method.
9. Preservation of bacterial cultures by various techniques.
10. Estimation of CFU count by spread plate method/pour plate method.
11. Motility by hanging drop method.