B. Sc (CBCS) Microbiology – I Year
Semester- II – Paper- II
BS204-DSC-1B: BACTERIOLOGY

Theory syllabus

Credits – 4

UNIT – I

1. Morphology and structure: Bacterial morphology – shape size structure, chemistry and function of cell wall, membrane, capsule, pili, flagella, plasmid, bacterial chromosome. Variant components – Capsule, flagella, fimbriae, endospore and storage granules.
2. Cell-wall: Composition and detailed structure of Gram-positive and Gram-negative cell walls, Archaebacterial cell wall, lipopolysaccharide (LPS), sphaeroplasts, protoplasts, and L-forms.
3. Cell Membrane: Structure, function and chemical composition of bacterial and archaeal cell membranes. Cytoplasm: Ribosomes, mesosomes, inclusion bodies, nucleoid, chromosome and plasmids

UNIT – II

1. Endospore: Structure, formation, stages of sporulation.
2. Nutritional requirements in bacteria and nutritional categories.
3. Culture media: components of media, natural and synthetic media, chemically defined media, complex media, selective, differential, indicator, enriched and enrichment media.

UNIT – III

1. Asexual methods of reproduction, logarithmic representation of bacterial populations, phases of growth, calculation of generation time and specific growth rate.
2. Aim and principles of classification, 5ystematic and taxonomy, concept of species, taxa, strain.
3. conventional, molecular and recent approaches to polyphasic bacterial taxonomy, evolutionary chronometers, rRNA oligonucleotide sequencing, signature sequences, and protein sequences.

UNIT – IV

1. Archaebacteria: General characteristics, phylogenetic overview, Morphology, metabolism, ecological significance and economic importance.
2. Eubacteria: Morphology, metabolism, ecological significance and economic importance of Non proteobacteria, Alpha proteobacteria, Beta proteobacteria, Gamma proteobacteria, Delta proteobacteria, Epsilon proteobacteria, Zeta proteobacteria
3. Differences between eubacteria and archaebacteria.

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Practical syllabus

Credits – 1

1. Preparation of different media: Synthetic Media, Complex media (Nutrient Agar, McConkey agar).
2. Simple staining.
3. Negative staining.
4. Gram's staining.
5. Acid fast staining (permanent slide only).
6. Capsule staining.
7. Spore staining.
8. Isolation of pure cultures of bacteria by streaking method.
9. Estimation of CFU count by spread plate method/pour plate method.
10. Demonstration of Motility by hanging drop method.

References:

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2. Black JG. (2008). Microbiology: Principles and Explorations. 7th edition. PrenticeHall
3. Madigan MT, and Martinko JM. (2014). Brock Biology of Micro-organisms. 14thedition. Parker J. Prentice Hall International, Inc.
4. Pelczar Jr MJ, Chan ECS, and Krieg NR. (2004). Microbiology. 5th edition TataMcGraw Hill.
5. Srivastava S and Srivastava PS. (2003). Understanding Bacteria. Kluwer AcademicPublishers, Dordrecht.
6. Stanier RY, Ingraham JL, Wheelis ML and Painter PR. (2005). GeneralMicrobiology. 5th edition McMillan.
7. Tortora GJ, Funke BR, and Case CL. (2008). Microbiology: An Introduction. 9thedition Pearson Education.
8. Willey JM, Sherwood LM, and Woolverton CJ. (2013). Prescott's Microbiology. 9th edition. McGraw Hill Higher Education.

Cappucino J and Sherman N. (2010). Microbiology: A Laboratory Manual. 9th edition.