B.Sc. I Year **Semester – I**

BIM -C101
DSC-1 FUNDAMENTALS OF MICROBIOLOGY

MM : 100
Time : 3 hrs
L Credit
4 4
Total Hours: 60

Sessional : 30
ESE : 70
Pass Marks : 40

Learning objectives:

- To understand the Vedic culture in which there is description of different information related to microorganisms and also they will know how earth evolved and also know the landmarks discoveries of microbiology
- To acquire knowledge of different technique to stain microorganism and how they can visualize the microorganisms in different types of microscope.
- To acquire an overall knowledge on the morphology and functions of the structures with the prokaryotes and eukaryotes.
- To become familiar with general characteristic of prokaryotic and Eukaryotic microbes and also acquire Knowledge of cellular organization, life cycle and economic importance of prokaryotic

Learning outcomes:

At the end of course student will be able

- To know the different milestones in the history of microbiology, importance of Vedic microbiology and scope of microbiology
- To understand and know the application of techniques used in the field of Microbiology.
- Identify key constituent prokaryotes cell and their function.
- To classify the prokaryotic cell by conventional as well as modern methods.
- To stain the bacteria with simple, differential and special stain.

UNIT–I

Vedic Microbiology: Agnihotra- A Vedic technology for environment purification, Origin of earth with reference to Veda, different terms used for microbes, distribution of microorganisms, microbes and diseases, different methods for control of microorganisms as described in Vedas., Health and healthy life; prevalence of utensil and food grains; Kshudra Rog in humans- PanduRoga (jaundice), Galaganda/Gandmala (mumps) and Masurika (smallpox)

(04 Lectures)

UNIT-II

Historical account of microbiology, spontaneous generation vs biogenesis, golden age of microbiology, contributions made by Anton von Leeuwenhoek, Louis Pasteur, Elie Metchnikoff, Robert Koch and Edward Jenner, Joseph Lister, Alexander Fleming; germ theory of disease.

(12 lecture)

UNIT III

General features of various groups of microorganisms: bacteria, cyanobacteria, archaea, mycoplasma, viruses (Morphology and Multiplication of T4 Bacteriophage), protozoa and fungi, Bacterial cells (size and arrangement), ultrastructure of bacterial cells.

(16 Lectures)

UNIT-IV

Growth and its mathematical expression, Culturable and non-culturable microorganisms (metagenomics): broad outline classification of different microorganisms, bacterial nomenclature, modern trends in bacterial taxonomy, Whittaker's five kingdom classification, three domain system of classification, Eight kingdom classification.

(12 Lectures)

UNIT-V

Staining Vs Dye,special stain, various methods of staining (Gram stain, differential stain, endospore, capsule, flagella and negative stain).Physical methods of microbial control: Heat, Low temperature, High pressure, Filtration, Desiccation, Osmotic pressure, Radiation,Chemical methods of microbial control,Antiseptic, Disinfectants: types and mode of action.

(16 Lectures)

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DCS 1 SEMESTER I BIM-C151 (LAB COURSE)

1. Principles and applications of microbiology laboratory instruments (Autoclave, Laminar Air Flow, Incubator, Hot Air Oven, and Light Microscope).
2. Perform Gram staining of bacteria.
3. Perform Endospore staining of bacteria.
4. Perform Capsule staining by negative staining technique of bacteria.
5. Perform Flagella staining of bacteria.
6. Perform Negative staining of bacteria.
7. Isolation of microorganisms from soil by pour plate method.
8. Isolation of microorganisms from air.
9. Effect of osmotic pressure.
10. Effect of radiation.
11. Cultivation of bacteriophages.
12. To prepare the Nutrient Agar Medium.
13. To prepare the Potato Dextrose Agar Medium.

Suggested Reading

1. Navneet, N. Handa, P. Kumar, S. Kumar, & S Gautam. 2011. Yagya Therapy. Swami Shraddhanand Educational and Welfare Society, Haridwar
2. Dubey, R.C. 2021. *Vedic microbiology- A Scientific Approach* (English Version), Motilal Banarasidas International, Delhi– 110007.
3. Dubey, R.C. 2020. *Vedic microbiology- Ek Vaijnanik Drishti*(Hindi Version), Aastha Prakashan, Delhi-110053
4. Dubey R.C. and Maheshwari, D.K. *A Textbook of Microbiology*. 3rd ed., S. Chand & Co, Ram Nagar, New Delhi, p. 1034. ISBN 81-219-2620-3
5. Dubey, R.C. and Maheshwari, D.K. *Practical Microbiology*. 2nd ed., S. Chand & Co. P Ltd, New Delhi, p. 413. ISBN: 81:219-2559-2
6. Dubey, R.C. *Advanced Biotechnology*. S. Chand & Co. P Ltd, New Delhi, p. 1161; ISBN: 81:219-4290-X.
7. Cappachino. Microbiology- A laboratory Manual, Pearson Education India ISBN: 978-9332535190
8. Powar and Daginawala. General Microbiology Vol1 and Vol2, Himalaya Publishing House,**ISBN-13:** 978-9350240892

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