UNIVERSITY OF LADAKH

SYLLABUS

OF

INTERDISCIPLINARY COURSE

OF

BIOTECHNOLOGY

(UNDER NEP – 2020)

(Implemented w.e.f Academic Session 2023-24)

UNDERGRADUATE INTER-DISCIPLINARY COURSE IN BIOTECHNOLOGY (NEP-2020)

Course Title: Understanding Microbial Life
Course Code: LFS-BT-101-G

Semester – I **Credit – 3** **Max Marks –75**

Objectives:

1. Providing a basic understanding of Microbiology.

2. To understand students about application of Microbes in human welfare.

3. Methods to isolate microbes from the surroundings.

UNIT-I

Microbial Diversity: Distribution and characterization Prokaryotic and Eukaryotic cells, Morphology and cell structure of groups of microorganisms eg. Bacteria and Unique features of viruses.

Unit –II

Cultivation and Maintenance of Bacteria: Methods of isolation and preservation.

Control of Microorganisms: By physical, chemical and chemotherapeutic Agents

Unit-III

Microbial growth: Growth curve, Generation time, measurement of growth and factors affecting growth of bacteria.

Unit IV

Water Microbiology: Bacterial pollutants of water, coliforms and non coliforms.

Food Microbiology: Important microorganism in food Microbiology: Moulds, Yeasts, bacteria.

References:

Essential readings:

1. Pelczar MJ, Chan ECS and Krieg NR. (1993). Microbiology. 5th edition. McGraw Hill Book Company.

2. Stanier RY, Ingraham JL, Wheelis ML, and Painter PR. (2005). General Microbiology. 5th edition. McMillan.

3.Christopher JW,Joanne W and Linda S(2022).Prescott's Microbiology.12th Edition McGraw Hill Book Company.

Suggested readings:

1. Alexopoulos CJ, Mims CW, and Blackwell M. (1996). Introductory Mycology. 4 th edition. John and Sons, Inc.

2. Jay JM, Loessner MJ and Golden DA. (2005). Modern Food Microbiology. 7thedition, CBS Publishers and Distributors, Delhi, India.

3. Kumar HD. (1990). Introductory Phycology. 2nd edition. Affiliated East Western Press.

4. Madigan MT, Martinko JM and Parker J. (2009). Brock Biology of Microorganisms. 12th edition. Pearson/Benjamin Cummings.

5. Tortora GJ, Funke BR, and Case CL. (2008). Microbiology: An Introduction. 9 th edition. Pearson Education.
8. Willey JM, Sherwood LM, and Woolverton CJ. (2008). Prescott, Harley and Klein's Microbiology. 7th edition. McGraw Hill Higher Education.

Semester – II **Credit – 3** **Max Marks – 75**

Course Title: Bio analytical tools
Course Code: LFS-BT-201-G

UNIT I

Simple microscopy, phase contrast microscopy, florescence and electron microscopy (TEM and SEM), pH meter

UNIT II

Principle and law of absorption fluorimetry, colorimetry, spectrophotometry (visible, UV, infrared), centrifugation

UNIT III

Introduction to the principle of chromatography. Paper chromatography, thin layer chromatography, column chromatography: silica and gel filtration, affinity chromatography.

UNIT IV

Introduction to electrophoresis. Polyacryl amide gel (native and SDS-PAGE), agarose-gel electrophoresis, isoelectric focusing, Western blotting.

Essential Readings:

1. Karp, G. 2010. Cell and Molecular Biology: Concepts and Experiments. 6th Edition. John Wiley& Sons. Inc.

2. De Robertis, E.D.P. and De Robertis, E.M.F. 2006. Cell and Molecular Biology. 8th edition. Lippincott Williams and Wilkins, Philadelphia.

3. Cooper, G.M. and Hausman, R.E. 2009. The Cell: A Molecular Approach. 5th edition. ASM Press & Sunderland, Washington, D.C.; Sinauer Associates, MA.

4. Becker, W.M., Kleinsmith, L.J., Hardin. J. and Bertoni, G. P. 2009 The World of the Cell.7th edition. Pearson Benjamin Cummings Publishing, San Francisco

5. Wilson and *Walker's* Principles and *Techniques* of Biochemistry and Molecular *Biology(2018)*