**MICROBIOLOGY CREDIT HOURS2+1**

**LEARNING OUTCOMES**:

**Students will able to know about:**

1. The fundamentals of Prokaryotic and Eukaryotic microbial life
2. The antimicrobial resistances
3. The biogeochemical cycles, interaction/and their importance in the environment with special emphasis on the role of microbes.

**COURSE CONTENTS:**

Overview and history of microbiology including microbial diversity (Archaea, bacteria, fungi, algae, protozoa , viruses), nutrition, growth, metabolism; cultivation; control of microorganisms: sterilization and disinfection, antimicrobial agents, antibiotics, antibiotic resistance and susceptibility, antifungal and antiviral agents; cell death; symbiosis, carbon, nitrogen, sulfur and phosphorus cycles; microbiology of soil, freshwater, seawater, potablewater and wastewater.

**PRACTICALS:**

1. Laboratory safety: Containment and decontamination.
2. Preparation and sterilization of bacteriological media and glassware.
3. An introduction to microscopy.
4. Principles of Staining Procedures: Simple , Gram’s , Acid-fast, cell-wall, flagellar, capsule, spore, negative staining and spirochaete staining.
5. Study of cell motility by hanging drop preparation.
6. Inoculation techniques.
7. Study of colony characteristics of microorganisms.
8. Standard plate count technique (SPC).
9. Bacterial growth curves
10. Microbiological analysis of air , soil, water
11. Biochemical tests (oxidase, catalase, Oxidation fermentation test)

**RECOMMENDED BOOKS:**

1. Black, J. G and Black, L.J.,2015 Microbiology: Principles and Explorations 9thEdition. John Wiley and Sons Ltd.
2. Burton, G. R. W. and Engelkrik, P. G. (2000). Microbiology for the Health Sciences. Lippincott Williams & Wilkins.
3. Peleczar, M. J., Chanm, E. C. S. and Krieg, N. R. (1990). Microbiology. McGraw-Hill.
4. Johnson, T.R., G.J., Funke, B.R. and case, C.L., 2015. Microbiology: An Introduction Tortora, 12thEdition. Pearson Publisher.
5. Johnson, T.R and case, C.L., 2015. Laboratory Experiments in Microbiology 11thEdition. John Willey and Sons Ltd.
6. [Willey](http://www.amazon.com/s/ref=dp_byline_sr_book_1?ie=UTF8&field-author=Joanne+Willey&search-alias=books&text=Joanne+Willey&sort=relevancerank), J., [Sherwood](http://www.amazon.com/s/ref=dp_byline_sr_book_2?ie=UTF8&field-author=Linda+Sherwood&search-alias=books&text=Linda+Sherwood&sort=relevancerank), L., and [Woolverton](http://www.amazon.com/s/ref=dp_byline_sr_book_3?ie=UTF8&field-author=Christopher+J.+Woolverton&search-alias=books&text=Christopher+J.+Woolverton&sort=relevancerank), C.J., 2016. Prescott's Microbiology 10thEdition. McGraw-Hill Education.

Tortora, G. J., Funke, B. R., & Case, C. L. 2016. Microbiology: An introduction.Pearson , Boston.