



# MANIPAL UNIVERSITY JAIPUR

School of Basic Sciences

Department of Biosciences

Course Hand-out

## Applied Microbiology | BT 2102 | 4 Credits | 3 | 0 | 4

Session: 2018 – 2019 | Faculty: Dr. Rakesh Kumar Sharma | Class: M.Sc. Core course (I Sem)

### A. Course Outcomes: At the end of the course, students will be able to:

- [BT 2102.1] Understand and discuss the development of microbiology, general characteristics, classification, structure and function of microorganisms.
- [BT 2102.2] Classify different microorganisms, microbial growth and their modification for development of microbial products.
- [BT 2102.3] Execute the strategies for isolation, identification and characterisation of microorganisms for food and water quality assessment, microbial product formulations and many more which ultimately enhance the competency for employment.
- [BT 2102.4] Identify role and applications of microorganisms in industry, health-care, environmental protection, food, beverage, agriculture and research
- [BT 2102.5] Explain that viruses, their general characteristics and structure, types of viruses, differences between various viruses
- [BT 2102.6] Develop methods for controlling the microbial growth and their application in clinics, labs and industry to enhance the employment skill

### B. SYLLABUS

Prokaryotic structure and function: Cell structure and function, Classifications. Viruses: Structure of major viruses, viral replication. Eukaryotic microorganisms: Fungi, Protozoa, Algae, etc. Growth and nutrition: Phases in bacterial growth, Growth Curve, Calculation of G-time, Physical and environmental requirements of growth, Microbial nutritional requirements, Types of culture media. Microbial genetics: DNA replication, Transcription and translation, Operon, Horizontal Gene Transfer (HGT). Applied microbiology: Environmental Microbiology, Microbial ecology, Aquatic microbiology, Food, Dairy and agricultural microbiology, Industrial microbiology. Microbial diseases: Major bacterial and viral with special reference to Rajasthan, diseases of animals and plants, Airborne, Foodborne, Soil-borne, Nosocomial and sexually transmitted/contagious diseases, Principles of disease and epidemiology, Host-microbe relationship, viral pathogenesis, Major viral diseases of plants and animals. Control of microorganisms: Physical, chemical and biological methods, Antimicrobial drugs, Antibiotic assays, Drug resistance in bacteria.

### C. TEXT BOOKS

1. L.M. Prescott, J.P. Harley and D.A. Klein. Microbiology. McGraw-Hill Science, USA, 2004.
2. M.J. Pelczar, E.C.S. Chan and N.R. Krieg. Microbiology: Concepts and Applications. McGraw-Hill Inc. USA, 1993.
3. J. Saxena, M. Baunthiyal and I. Ravi. Laboratory Manual of Microbiology, Biochemistry and Molecular Biology. Scientific Publishers, India, 2012

### D. REFERENCE BOOKS

1. R.W. Bauman. *Microbiology with Diseases by Body System*. Benjamin Cummings, USA, 2011.
2. G. Capuccino and N. Sherman. *Microbiology-A Laboratory Manual*. Benjamin Cummings, USA, 2004.
3. J.C. Pommerville. *Alcamo's Fundamentals of Microbiology*. Jones & Bartlett Publishers, USA, 2010.
4. Barnes and R. Brand. *Microbiology Lab Manual*, Kendall Hunt Pub Company, 1994
5. T.R. Johnson, C.L. Case. *Laboratory Experiments in Microbiology Lab Manual*, Benjamin Cummings, USA, 1997.
6. D. J. Brenner, N.R. Krieg and J. R. Staley. *Bergey's Manual of Systematic Bacteriology Vol. 1&2*, Springer, USA, 2005.

