0SAURASHTRA UNIVERSITY, RAJKOT
SYLLABUS FOR MICROBIOLOGY SEMESTER - III
(With effect from June 2020)
MB-301- MICROBIAL DIVERSITY
(THEORY)

UNIT 1: INTRODUCTION TO MICROBIAL DIVERSITY

(Credit-0.8, Teaching Hours-12, Marks-14)

1.1 Biodiversity- Microbial evolution and types of diversity
1.2 Introduction and overview of microbial taxonomy, taxonomic ranks of microorganisms and classification systems (Phenetic, phylogenetic and polyphasic classification)
1.3 Major characteristics used in taxonomy: classical and molecular characteristics
1.4 Major divisions of life and groups of microorganisms: study of different classifications and place of microbes
1.5 Introduction and overview of Metagenomics and its applications

REFERENCE BOOKS (SEMESTER 3 UNIT 1)

1. Frazier, W.C., Westhoff, D.C. (1978). Food Microbiology. Tata McGraw-Hill Publishing Company.
2. Pelczar, M.J., Chan E.C.S., Krieg, N.R., Microbiology, 5 Edition. Tata McGraw Hill Publication Co. Ltd. New Delhi.
3. Salle, S.J. (1974).Fundamental Principals of Bacteriology, Tata McGraw Hill Publication Co. Ltd. New Delhi.
4. Purohit, S.S., Microbiology-Fundamentals and Applications-6th Edition, Agrobios Publications, Delhi.

UNIT 2: PROKARYOTIC DIVERSITY

(Credit- 0.8, Teaching Hours-12, Marks-14)

2.1 Introduction and overview of Bergey's Manual and Habitat and distinguishing features of Gram negative & positive bacteria
2.2 Aerobic/ Microaerophilic Gram negative bacteria:
- 2.2.1 Motile, helical &vibrioid
- 2.2.2 Non-motile curved bacteria
- 2.2.3 Rods and cocci

2.3 Facultative anaerobic Gram negative bacteria:
- 2.3.1 Rods, curved and helical bacteria
- 2.3.2 Dissimilatory Sulfate reducers

2.4 Anaerobic Gram negative bacteria:
- 2.4.1 Anaerobic cocci
- 2.4.2 Phototrophic bacteria (Anoxygenic and oxygenic phototrophs)

2. 5 Gram positive bacteria – General features of:
- 2.5.1 Endospore forming rods and cocci
- 2.5.2 Asporogenous rods and cocci
- 2.5.3 Mycobacteria and Actinomycetes

REFERENCE BOOKS (SEMESTER 3 UNIT 2)

1. Presscott, M.J., Harley, J.P., Klein, D.A. (2002). Microbiology, 5th Edition. New York: WCB Mc GrawHill publication.
2. Pelczar, M.J., Chan E.C.S., Krieg, N.R., Microbiology, 5 Edition. Tata McGraw Hill Publication Co. Ltd. New Delhi.
3. Salle, S.J. (1974).Fundamental Principals of Bacteriology, Tata McGraw Hill Publication Co. Ltd. New Delhi.
4. Purohit, S.S., Microbiology-Fundamentals and Applications-6th Edition, Agrobios Publications, Delhi.

5. Stainer, R.Y., Iingraham, J.L., Wheelis, M.L., Painter, R.K. General Microbiology, 5th Edition. MacMillan Press Ltd., London.

UNIT 3: DIVERSITY OF SOME UNUSVAL PROKATYOTES

3.1 Bacteria with unusual morphology
- 3.1.1 Budding and appendaged bacteria
- 3.1.2 Sheathed Bacteria
- 3.1.3 Mycoplasma

3.2 Bacteria with gliding mot ility
3.3 Rickettsia and Chlamydia
3.4 Archaeabacteria
- 3.4.1 Introduct ion and general features of archaea
- 3.4.2 Types of Extremophilic Microorganisms: over view of Thermophiles, Halophiles, Acidophi les, Alkalophi les, Barophiles and Methanogens

3.5 Importance of prokaryotic microorganisms

REFERENCE BOOKS (SEMESTER 3 UNIT 3)

1. Pelczar, M.J., Chan E.C.S., Krieg, N.R., Microbiology, 5 Edition. Tata McGraw Hill Publication Co. Ltd. New Delhi.
2. Modi, H.A. Elementary Microbiology - Vol –I & II, AktaPrakashan, Nadiyad.
3. Tortora, Funke& Case. Microbiology-An Introduction, 8 Edition, Pearson Education, Delhi.
4. Powar and Daginawala, General Microbiology Vol-II. Himalaya Publishing House, Mumbai.
5. Stainer, R.Y., Iingraham, J.L., Wheelis, M.L., Painter, R.K. **General Microbiology, 5th Edition**. MacMillan Press Ltd., London.
6. Salle, S.J. Fundamental Principals of Bacteriology, Tata McGraw Hill Publication Co. Ltd. New Delhi

4: EUKARYOTIC DIVERSITY

A: FUNGI
4.1 General characteristics, occurrence, Structure, Reproduct ion (Mucor and Aspergil lus)
4.2 Economic importance of fungi
B: ALGAE
4.3 General Characteristics, Occurrence & Ultra - Structure
4.4 Economic importance of Algae
C: PROTOZOA
4.5 General Characteristics, Occurrence, Ultra - Structure & Economic importance of Protozoa

REFERENCE BOOKS (SEMESTER 3 UNIT 4)

1 Dubey, R.C.andMaheshwari, D.K., **A Text Book of Microbiology**, S. Chand Publications, New Delhi.
2 Pelczar, M.J., Chan E.C.S., Krieg, N.R., Microbiology, 5 Edition. Tata McGraw Hill Publication Co. Ltd. New Delhi.
3 Tortora, Funke& Case. Microbiology-An Introduction, 8 Edition, Pearson Education, Delhi.
4 Powar and Daginawala, General Microbiology Vol-II. Himalaya Publishing House, Mumbai.
5 Stanier, R.Y., Iingraham, J.L., Wheelis, M.L., Painter, R.K. General Microbiology, 5th Edition. MacMillan Press Ltd., London.
6 Purohit, S.S., Microbiology-Fundamentals and Applications-6th Edition, Agrobios Publications, Delhi.

UNIT 5: AKARYOTIC DIVERSITY

5.1 Introduction, General Characteristics and Classification (overview of different classifications)
5.2 Cultivation of Viruses
5.3 Bacterial Viruses: general structure (T4 phage), Lytic life cycle (T4 phage), lysogenic life cycle with genetics (Lambda phage)

5.4 Introduction to Animal Viruses: Structure (HIV), Cytocidal effects, Viruses and Cancer, Prions
5.5 Introduction to Plant Viruses: Structure of TMV, Economic importance, Viroids

REFERENCE BOOKS (SEMESTER 3 UNIT 5)

1. Pelczar, M.J., Chan E.C.S., Krieg, N.R., Microbiology, 5th Edition. Tata McGraw Hill Publication Co. Ltd. New Delhi.
2. Frobisher M., Hinsdill, Crabtree and Goodherat Fundamentals of Microbiology, 9th Edition. W.B Saunders Co. USA.
3. Purohit, S.S., Microbiology-Fundamentals and Applications-6th Edition, Agrobios Publications, Delhi.
Mani, A., Selwaraj, A.M., Narayanan L.M., and Arumngam, N., Microbiology, Saras Publication, Delhi
5. Prescott, Healey and Klein., Microbiology-5th International Edition, Tata-McGraw Hill publications, Delhi
6. Atlas. R.M., Principles of Microbiology- 2nd Edition

MB-301- MICROBIAL DIVERSITY (PRACTICAL)

Practical Hours – 3hrs/day for 2 days/Week Total Credit – 3 Total 6 hours/Week

1) Isolation of Gram negative bacteria from the given sample.

2) Identification of Gram negative bacteria from the given pure culture using biochemical media (*E.coli*, *Entrobacteraerogens*, *Proteus*, *Salmonella)*

3) Isolation of Gram positive bacteria from the given sample.

4) Identification of Gram positive bacteria from the given pure culture using biochemical media (*Bacillus megaterium*, *Bacillus subtilis*, *staphylococcus aureus*, *Streptococcus*)

5) Identification of Fungi on the basis of Morphological Characteristics.

6) Cultivation of yeast from different natural samples and its morphological characterization using microscopic observation.

7) Microscopic observation of different algae from the given samples.

8) Microscopic observation of different protozoa from the given sample.

9) Isolation and cultivation of bacteriophage of *E.coli*from the given sewage sample.

10) Cultivation of Extremophile (Halophile/thermophile/acidophile/alkalophile/psychophile)

REFERENCE BOOKS (SEMESTER 3 PRACTICALS)

1. Patel. R.J., Patel. K.R., Experimental Microbiology, Vol-I, Aditya Publications, Ahmedabad, India.

2. Patel. R.J., Patel. K.R., Experimental Microbiology, Vol-II, Aditya Publications, Ahmedabad, India.

3. Dubey. R.C., Maheshwari. D.K., Practical Microbiology, S.Chand& Company Ltd., New Delhi

4. Konika Sharma, Manual of Microbiology – Tools and Techniques ,Ane books, Delhi