



Course Content	Hours
<b>Unit. 1: Introduction to Microbial Diversity</b>	<b>9 hrs</b>
<ul style="list-style-type: none"><li>• Introduction to Biodiversity- Microbial evolution and diversity, Types of diversity</li><li>• Microbial Taxonomy: Introduction and overview, Taxonomic ranks of microorganisms, Classification systems</li><li>• Major characteristics used in taxonomy</li><li>• Assessing Microbial Phylogeny</li></ul>	
<b>Unit. 2: Prokaryotic Diversity</b>	<b>9 hrs</b>
<ul style="list-style-type: none"><li>• <u>Gram negative bacteria</u> – General features of:<ul style="list-style-type: none"><li>○ Aerobic/Microaerophilic motile, helical vibroid</li><li>○ Non-motile curved bacteria</li><li>○ Aerobic/Microaerophilic rods and cocci</li></ul></li><li>• <u>Gram negative bacteria</u> – General features of:<ul style="list-style-type: none"><li>○ Facultative anaerobes – rods, curved and helical bacteria</li><li>○ Dissimilatory Sulphate reducers</li></ul></li><li>• <u>Gram negative bacteria</u> – General features of:<ul style="list-style-type: none"><li>○ Anaerobic cocci</li><li>○ Phototrophic bacteria</li></ul></li><li>• <u>Gram positive bacteria</u> – General features of:<ul style="list-style-type: none"><li>○ Endospore forming rods and cocci</li><li>○ Asporogenous rods</li><li>○ Mycobacteria and Actinomycetes</li></ul></li></ul>	
<b>Unit 3: Diversity of some unusual Prokaryotes</b>	<b>9 hrs</b>
<ul style="list-style-type: none"><li>• <u>General Features of Bacteria with unusual morphology:</u><ul style="list-style-type: none"><li>○ Budding and appendaged bacteria</li><li>○ Sheathed Bacteria</li><li>○ Mycoplasma</li></ul></li><li>• Bacteria with gliding motility,</li><li>• Rickettsia and Chlamydia</li><li>• Introduction to Archaea<ul style="list-style-type: none"><li>○ Thermophiles</li><li>○ Halophiles</li><li>○ Acidophiles</li><li>○ Barophiles</li><li>○ Methanogens</li><li>○ Psychrophiles</li></ul></li></ul>	
<b>Unit. 4: Eukaryotic Diversity</b>	<b>9 hrs</b>
<ul style="list-style-type: none"><li>• Fungi: General characteristics – Definition, occurrence, structure and Economic importance of fungi</li><li>• Algae: General Characteristics – Definition, Occurrence, Ultra- Structure, Reproduction</li><li>• General Characteristics – Definition, Occurrence, Ultra- Structure, Reproduction and Economic importance of Protozoa</li><li>• Economic importance of Fungi, Algae and Protozoa</li></ul>	



<b>Unit. 5: Akaryotic Diversity - Viruses</b>	<b>9 hrs</b>
<ul style="list-style-type: none"><li>• Introduction to Viruses: Definition, General features of viruses: Size, Capsids symmetry, Chemical Nature, Life cycle</li><li>• Overview of Bacterial Virus: T4 and Lambda</li><li>• Overview of plant Virus: TMV</li><li>• Overview of Animal viruses; HIV</li></ul>	

#### **Text Books:**

- Pelczar, M.J., Chan, E.C.S., Kreig, N.R. (1993). Microbiology, 5<sup>th</sup> Edition. New Delhi: Tata McGraw Hill Publishing Company Ltd.
- Prescott, M.J., Harley, J.P., Klein, D.A. (2002). Microbiology, 5<sup>th</sup> Edition, New York: WCB McGrawHill publication.

#### **Reference Books:**

1. Modi, H.A. Elementary Microbiology - Vol -I, AktaPrakashan, Nadiyad.
2. Modi, H.A. Elementary Microbiology – Vol-II, AktaPrakashan, Nadiyad.
3. Dubey, R.C.and Maheshwari, D.K., A Text Book of Microbiology, S. Chand Publications, New Delhi.
4. Tortora, Funke & Case. Microbiology-An Introduction, 8 Edition, Pearson Education, Delhi.
5. Powar and Dagainawala, General Microbiology Vol-II. Himalaya Publishing House, Mumbai.
6. Atlas. R.M., Principles of Microbiology- 2<sup>nd</sup> Edition ,

#### **Pedagogic tools:**

- Chalk and Board
- PPT and Videos.
- Assignment
- Class Activity: Think-Pair-Share / Class Test

#### **Suggested reading / E-resources**

- Bacterial Growth Curve Protocol | Protocols | Microbe Notes
- NPTEL :: Biotechnology - Microbiology
- 9: Microbial Growth - Biology LibreTexts
- Lecture notes, lecture 1 - Micro Chapter The microbial world The microbes - StuDocu

#### **Suggested MOOCs**

- General Microbiology - Course (swyam2.ac.in)



## Major Practical-4

Sr. No.	Experiment
1	Isolation of Gram negative bacteria from the given sample.
2	Identification of Gram negative bacteria from the given pure culture using biochemical media ( <i>E.coli</i> , <i>Enterobacter aerogens</i> , <i>Proteus</i> , <i>Salmonella</i> )
3	Isolation of Gram positive bacteria from the given sample.
4	Identification of Gram positive bacteria from the given pure culture using biochemical media ( <i>Bacillus megaterium</i> , <i>Bacillus subtilis</i> , <i>Staphylococcus aureus</i> )
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 Bacteriaophage of <i>E.coli</i> from the given sewage sample.

### Reference Books:

1. Jayaraman, J. (2011). Laboratory Manual in Biochemistry: New Age International Private Limited. India
2. Sawhney S.K., Singh, R. (2005). Introductory Practical Biochemistry: Alpha Science International.
3. Cappuccino, J.G., Sherman, N. (2004). International student edition: Microbiology- A laboratory Manual 4<sup>th</sup> edition: Benjamin Cummings publications

### Pedagogic tools:

- Chalk and Board
- Power point presentation
- Video

### Suggested reading / E-resources

- <https://www.youtube.com/watch?v=5YBdvAiKV24>
- <https://www.youtube.com/watch?v=-IEOxfIPWsk>
- <https://www.youtube.com/watch?v=omOjA-mIZVY>

### Suggested MOOCs

- <https://www.my-mooc.com/en/mooc/extremes-life-microbes-diversity-kyotoux-003x-0/>
- <https://www.mbl.edu/education/advanced-research-training-courses/course-offerings/microbial-diversity>
- <https://www.lunduniversity.lu.se/lubas/i-uoh-lu-BIOR18>