

<b>INSTITUTE</b>	<b>FACULTY OF SCIENCE</b>
<b>PROGRAM</b>	<b>BACHELOR OF SCIENCE (MICROBIOLOGY)</b>
<b>SEMESTER</b>	<b>3</b>
<b>COURSE TITLE</b>	<b>MICROBIAL PHYSIOLOGY</b>
<b>COURSE CODE</b>	<b>02MB0203</b>
<b>COURSE CREDITS</b>	<b>4</b>

**Objective:**

- 1 To familiarize students with different conditions and requirements associated with microbial growth and reproduction.

**Course Outcomes:** After completion of this course, student will be able to:

- 1 Describe and differentiate type of growth requirement for specific microbial culture.
- 2 Describe and use the methods for culturing aerobic and anaerobic microbes.
- 3 Describe and differentiate different mode of reproduction in microorganism.
- 4 Depict the role of microbial growth parameters and factors associated with it.

**Pre-requisite of course:**Not applicable

**Teaching and Examination Scheme**

<b>Theory Hours</b>	<b>Tutorial Hours</b>	<b>Practical Hours</b>	<b>ESE</b>	<b>IA</b>	<b>CSE</b>	<b>Viva</b>	<b>Term Work</b>
4	0	0	50	30	20	0	0

<b>Contents : Unit</b>	<b>Topics</b>	<b>Contact Hours</b>
1	<b>Microbial Nutrition</b> 1.1 Nutritional types; Requirement of Nutrients for microbes. 1.2 Classification of microorganisms based on carbon, energy and electron sources viz. 1.3 Photoautotrophs; Photoorganotrophs 1.4 Chemo-lithotrophs: Hydrogen, Sulphur, Iron, Nitrate, Ammonia oxidizing bacteria, Annamox	12
2	<b>Pure cultures, Cultural characteristics and Preservation</b> 2.1 Methods of isolating pure culture. Selective methods for bacterium selection. 2.2 Methods for culturing aerobic and anaerobic bacteria; 2.3 Colony and broth culture characteristics; 2.4 Maintenance and preservation of Microorganisms.	18
3	<b>Modes of Microbial Reproduction</b> 3.1 Bacterial reproduction: Binary fission, Conjugation, Endospore formation, Transformation. 3.2 Cyanobacteria and algae: Vegetative, Asexual and Sexual 3.3 Fungi: Fragmentation, Budding and Spore 3.4 Virus: Lytic and Lysogenic 3.5 Protozoa: binary fission and sexual fusion	15

<b>Contents : Unit</b>	<b>Topics</b>	<b>Contact Hours</b>
4	<b>Bacterial Growth</b> 4.1 Growth Curve of Bacteria, 4.2 Measurement of microbial growth 4.3 Synchronous growth and batch / continuous culture 4.4 Physical factors required for growth: Temperature; pH; Atmospheric Pressure; Salt Concentration, Radiation	15
<b>Total Hours</b>		<b>60</b>

#### **Textbook :**

- 1 Microbial Physiology, 4th Ed., Moat, A.G. and Foster, S.W., John Wiley and Sons, New York., 2004
- 2 General Microbiology, 5th Edition., Stanier, R.Y., Ingraham, J.L., Wheelis, M.L., Painter, R.K., MacMillan Press Ltd., London., 1987
- 3 Microbiology, 5th Edition., Pelczar, M.J., Chan E.C.S., Krieg, N.R., Tata McGraw Hill Publication Co. Ltd. New Delhi., 1993

#### **References:**

- 1 Microbiology, Microbiology, Prescott, L.M., Harley, J.P. and Klein, D.A., Tata McGraw Hill Book Company., 2002
- 2 Experimental Microbiology, Vol. 1, Experimental Microbiology, Vol. 1, RJ Patel and KR Patel, Aditya Publishing House Pvt. Ltd., 2016
- 3 Practical Microbiology, Practical Microbiology, Dubey. R.C., Maheshwari. D.K., S.Chand & Company Ltd., New Delhi., 1991
- 4 Principles of Microbiology- 2nd Edition., Principles of Microbiology- 2nd Edition., Atlas. R.M., Tata McGraw Hill Education Pvt. Ltd. New Delhi., 2015

#### **Suggested Theory Distribution:**

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
<b>Remember / Knowledge</b>	<b>Understand</b>	<b>Apply</b>	<b>Analyze</b>	<b>Evaluate</b>	<b>Higher order Thinking / Creative</b>
20.00	30.00	25.00	15.00	10.00	0.00

#### **Instructional Method:**

- 1 The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, etc.
- 2 The internal evaluation will be done on the basis of continuous evaluation of students in the class-room in the form of attendance, assignments, verbal interactions etc.

**Instructional Method:**

- 3 Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory.

**Supplementary Resources:**

- 1 <https://youtu.be/i9Wg8ECERMo>
- 2 <https://youtu.be/txSq-7BchUQ>
- 3 <https://youtu.be/DvLVDkmAayU>
- 4 <https://youtu.be/DfA-MHgi2ws>
- 5 <https://youtu.be/05FI-hSwCzw>