Subject Code: 02MB0104
Subject Name: Basics of Microbiology
B.Sc. Semester-I

Objective: Students should gain knowledge about scope, importance and techniques used in microbiology.

Credits Earned: 4 Credits

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

- Understands the importance of microbiology with its scope.
- Compare importance of different types of Microscopy.
- Analyse the requirements for growth and visualisation of microbes.
- Able to apply different methods to control microbes.

Teaching and Examination Scheme

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE (E)	Mid sem (M)	Internal (I)	Viva (V)	Term work (TW)	
4	0	0	4	50	30	20	0	0	100

Contents:

Unit	Topics	Contact Hours
1	History and scope of Microbiology Discovery of Microorganisms, Types of Microbes, Spontaneous generation theory, Koch's postulate, Golden age of Microbiology, Historical perspective of Microbes as agent for infectious disease and as important tool for industrial products.	10
2	Microscope and study of Microbial structure: Basis of Microscopes: Refractive index, resolution, type of lenses, focal point, focal length. Types of Microscopes: Light microscopes, Bright field microscope, Dark field microscope, Phase contrast microscope, Fluorescence microscope, Electron Microscope (Scanning electron microscope and Transmission electron microscope).	25

3	Culture media and staining of Microbes: Components of media, natural and synthetic media, Types of Media: complex media, selective, differential, indicator media, enriched media and transport media. Staining of Microbes: Auxochromes, chromophores, dyes. Classification of stains, Mechanism of gram staining, acid fast staining, negative staining, capsule staining, flagella staining, and endospore staining.	15
4	Control of Microbes Physical Method: Heat, Low temperature, Radiation, Filtration. Chemical Method: Phenolics, Alcohols, Halogens, Heavy metals, Quaternary ammonium compounds, Aldehydes, Sterilizing gases. Phenol co-efficient method.	15
	Total Hours	60

Recommended Textbooks:

1. Pommerville, J. C. (2013). *Fundamentals of microbiology*. Jones & Bartlett Publishers.
2. Willey, J. M., Sherwood, L., & Woolverton, C. J. (2011). *Prescott's microbiology* (Vol. 7). New York: McGraw-Hill.
3. Black, J. G., & Black, L. J. (2018). *Microbiology: principles and explorations*. John Wiley & Sons.
4. Atlas, R. M. (1997). Principles of microbiology. Wm. C. *C Brown Publiser USA*.
5. Tortora, G. J., Funke, B. R., & Case, C. L. (2018). *Microbiology: an introduction*. Pearson.

Suggested Theory distribution:

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

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
20%	30%	25%	15%	10%	0%

Instructional Method:

a. 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.

b. 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.

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