Department of Liberal Education
Era University, Lucknow
Course Outline
Effective From: 2023-24

Name of the Program	**B.A. / B.Sc. (LIBERAL EDUCATION)**			**Year/ Semester:**	**1st / 1st**
Course Name	**General Microbiology**	**Course Code:**	**MB101**	**Type:**	**Theory**
Credits	**05**			**Total Sessions Hours:**	**75 Hours**
Evaluation Spread	**Internal Continuous Assessment:**	**50 Marks**		**End Term Exam:**	**50 Marks**
Type of Course	○ Compulsory	◉ Core		○ Creative	○ Life Skill
Course Objectives	This module will help students to understand following; a. Classification of Microbes; Bacteria, Viruses, Fungi & Parasites etc. b. Structure of each Bacterial cell & its functions. c. Physiology of a Bacterial cell. d. Bacterial cell wall e. Sterilization and disinfection f. Isolation of microorganisms g. Staining techniques				
Course Outcomes (CO): *After the successful course completion, learners will develop following attributes:*					
Course Outcome (CO)	**Attributes**				
CO1	To understand the history, relevance of microbiology and classification of microbes and microbial diversity in the living world.				
CO2	Student will understand about bacterial, fungal, cyanobacterial, algal, viral, rickettesial classification, culturing, reproduction and with its significance.				
CO3	Students will understand the different type of sterilization techniques used in microbiology.				
CO4	Students will learn different methods of staining of microbes and also gain skill of isolation, culturing and maintenance of pure culture.				
Pedagogy	Interactive, discussion-bases, student-centered, presentation.				
Internal Evaluation Mode	Mid-term Examination: 20 Marks Activity: 10 Marks Class test: 05 Marks Online Test/Objective Test: 05 Marks Assignments/Presentation: 05 Marks Attendance: 05 Marks				
Session Details	**Topic**			**Hours**	**Mapped CO**
Unit 1	**Introduction, history and scope of Microbiology** • History, scope, branches of microbiology and relevance of microbiology • Contribution of prominent microbiologist; Antony Van			15	CO1

	Leeuwenhoek, Edward Jenner, Louis Pasteur, Robert Koch, Joseph Lister, Alexander Fleming, Ivanowsky, SubbaRao • Position of microorganisms in the living world • 5 kingdom classification of Whittaker and 3 kingdom classification • Bergey's manual and introduction to classification of bacteria **Activity:** On the basis of study of the above microbiologist prepare a list of issues on which studies has to be conduct in microbiology.		
Unit 2	**Bacterial morphology** • Ultrastructure of bacterial cell, cell wall, plasma membrane, capsule, flagella, nucleoid, and reserve material • Differences between archaebacterial and eubacterial cell • General features of Rickettsia, Chlamydia, Mollicutes and Cynobacteria **The viruses** • General properties and structure of animal viruses: Influenza, HIV • Plant viruses: TMV; bacterial viruses: Lambda Phage and T4 bacteriophage; general features of Prions and Viroids **Fungi** • General characteristics, classification & reproduction of Saccharomyces, Aspergillus **Protozoa** • General characteristics, classification & reproduction of Giardia, Entamoeba **Activity:** Observe the difference in size between bacteria and other unicellular microorganisms under microscope and prepare table or chart.	20	CO2, CO4
Unit 3	**Techniques in Microbiology** • Principles of microscopy, construction and application • Principles, construction and application of centrifuge • bacteriological Incubator & Incubator Shaker • Laminar flow • Colourimeter & Spectrophotometer (UV-Vis) **Sterilization techniques and control of microorganisms** • Definition of sterilization and its physical methods; Use of moist heat- heat under pressure, autoclave, boiling, pasteurization, fractional sterilization, tyndallisation • Use of dry heat- hot air oven, incineration • Filtration- Seitz filter, membrane filter, HEPA filter • Radiation- Ionizing and non- ionizing • Chemical methods- Alcohols, aldehydes, phenols, halogens, metallic salts, ethylene oxide **Activity:** Spot the given instruments used in microbiology lab and discuss its principle,working and diagram on chart.	20	CO3
Unit 4	**Isolation, cultivation and preservation of microorganisms** • Culture media and its types • Methods for enumeration & isolation of microorganisms • Isolation of anaerobic microorganisms • Maintenance and preservation of pure culture **Stains and staining techniques**	20	CO4

	• Staining techniques, principles, procedures and applications of Simple staining, negative staining, differential staining, structural staining **Activity:** Observations of different stained microorganisms and identify their size, shape and staining properties and prepare table with diagram.		

CO-PO and PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1										2			2	
CO2	1								1	1	2		2	
CO3	2		2	3	3	2	2		3		2		2	2
CO4	2		2	3	3	2	2		3	2			2	2

Strongcontribution-3, Averagecontribution-2, Lowcontribution-1,

Suggested Readings:

Text- Books	1. Aneja K.R., Experiments in Microbiology, plant pathology, Tissue culture and Mushroom cultivation, New Age International, New Delhi. 2. DubeyR.C.and Maheshwari D.K., Textbook of microbiology, S Chand Publications.
Reference Books	1. Pelczar M.J., Chan E.C.S and Kreig N.R., Microbiology, Mcgraw-Hill Book Company, New York. 2. Prescott Lansing M., Harley John P. and Klein Donald A., Microbiology, WCB Mcgraw- Hill, New York.
Para Text	**Unit 1:** 1. **https://cmp.berkeey.edu/bacteria/bacteria.html** **Unit 2:** 1. **https://www.livescience.com/53272-what-is-a-virus.html** **Unit 3:** **1. https://www.slideshare.net/sardar1109/algae-notes-1** **Unit4:** **https://www.sciencedirect.com/topics/earth-and-planetary-sciences/microscopy**

Recapitulation & Examination Pattern

Internal Continuous Assessment:

Component	Marks	Pattern
Mid Semester	20	**Section A:** Contains **10** MCQs/Fill in the blanks/One Word Answer/ True-False type of questions. Each question carries **0.5 mark.** **Section B:** Contains **07** descriptive questions out of which **05** questions are to be attempted. Each question carries **03 marks**.
Activity	10	Will be decided by subject teacher.
Class Test	05	Contains **05 descriptive questions.** Each question carries **01** mark.
Online Test/ Objective Test	05	Contains **10 multiple choice questions.** Each question carries **0.5** mark.
Assignment/ Presentation	05	Assignmet to be made on topics and instruction given by subject teacher
Attendance	05	As per policy.
Total Marks	**50**	

Course created by: Dr. Manaal Zahera **Signature:**	**Approved by: Dr. Amita Jain** **Signature:**