

GOVT. COLLEGE FOR WOMEN, PARADE GROUND, JAMMU-180001, J&K.

(Erstwhile Maharani Mahila College)

Autonomous College affiliated to the University of Jammu

College with Potential for Excellence, 2016

(Estd. 1944)



**Syllabus and Course of Study in Zoology B.Sc. Semester-V
for examinations to be held in
2024-25, 2025-26, 2026-27**

Core Course No.	UZOMJT- 503
Maximum Marks	50
Minimum Pass Marks	External-15, Internal-04
Core Course Title	Microbiology
Credits	2
Marks (External)	40marks
Internal Assessment	10 marks
Duration of external Exam.	2 Hours
Date of BOS	12-06-24

OBJECTIVE:

- To impart the students with basic principles of Microbiology and their applications to humankind.
- This course offers a comprehensive study of the field of microbiology. The course will give detailed insights into Structure and function of microbes (cellular structures, and growth); microbial ecology, microbial diversity (prokaryotes, eukaryotes, viruses),;
- Insight into pathogenicity, epidemiology, control of microbes, and diseases)
- To provide knowledge about beneficial and harmful microbes and their application to agriculture and industry

LEARNING OUTCOME:

By the end of the program the students will be able to:

- Understand the distribution, morphology and physiology of microorganisms
- Demonstrate an understanding of the structural similarities and differences among microbes and the unique structure/function relationships of prokaryotic cells.
- Knowledge and understanding of concepts of microbiology and its application in food, agriculture, beverages.

- Exploring the microbial world and analyzing the specific benefits and challenges
- Understanding biochemical and physiological aspects of microbes and developing broader perspective to identify innovative solutions for present and future challenges posed by microbes

UNIT 1: Historical development, major contributions, origin and diversity of microorganisms **10 hrs**

1.1 Historical development of microbiology - Contributions of Anton Von Leeuwenhoek, Louis Pasteur, Robert Koch, Joseph Lister and Edward Jenner, Alexander Fleming, Martinus Beijerinck, Sergei Winogradsky, Elie Metchnikoff.

1.2 Contributions of Indian scientists in the field of Microbiology.

1.3 An overview of Scope of Microbiology

1.4 General characteristics of different groups:

Acellular microorganisms (Viruses, Viroids, Prions) and

Cellular microorganisms: Bacteria: eubacteria, chlamydiae & rickettsiae (obligate intracellular parasites), mycoplasma, and archaeobacteria (extremophiles), Gram positive and gram negative bacteria; Algae; Fungi and Protozoa with emphasis on occurrence, morphology and economic importance.

UNIT 2: Microbial Physiology; Environmental and Sanitary Microbiology **10 hrs**

2.1 Microbial Growth and Effect of Environment on Microbial Growth, Effect of temp, PH, Oxygen, nutrition on growth

2.2 Microbial Nutrition: Microbial nutrients, Classification of organisms based on carbon source, energy source and electron source, Macro and micronutrients.

2.3 Soil and Air Microbiology: Soil and Air as a major component of environment. Distribution of microorganisms in soil and air. Major types of beneficial microorganisms in soil. Major types of harmful microorganisms in soil

2.4 Water Microbiology: Microorganisms of different water bodies

2.5 Airborne microbial infections(causative agent, symptoms, transmission and treatment): Measles,Tuberculosis; waterborne microbial infections (causative agent, symptoms, transmission and treatment): Amoebiasis, Cholera, Hepatitis E

UNIT 3: Agricultural and Industrial microbiology **10hrs**

3.1 Biofertilizers – definition, importance – types. Plant response to biofertilizers application.

3.2 Biopesticides and their importance: Bacterial, fungal and viral

3.3Types of fermentation – single, batch, continuous. Food fermentations and food produced by microbes: bread, beverages, fermented dairy products

3.4 Industrial products derived from microbes: industrial enzymes – amylase, protease, cellulase. Aminoacids production: glutamic acid and lysine.

Suggested Readings:

1. General Microbiology 1 st Edition, 2020 , Linda Bruslind, Oregon State University
2. Prescott, Harley, Klein's Microbiology, J.M. Willey, L.M. Sherwood, C.J. Woolverton, 7th International, edition 2008, McGraw Hill.
3. Foundations in Microbiology, K. P. Talaro, 7th International edition 2009, McGraw Hill.
4. A Textbook of Microbiology, R. C. Dubey and D. K. Maheshwari, 1st edition, 1999, S. Chand & Company Ltd.
5. Black, J.G. 2008. Microbiology principles and explorations. 7edn. John Wiley and Sons Inc., New Jersey 846 pp.
6. Pommerville, J.C. Alcamo's Fundamentals of Microbiology. Jones and Bartlett Pub..Sudbury, 835 pp
7. Moat AG and Foster JW. (2002). Microbial Physiology. 4th edition. John Wiley & Sons 3. Reddy SR and Reddy SM. (2005).
8. Microbial Physiology. Scientific Publishers India.
9. Engelkirk P.G. and Duben-Engelkirk J. (2015) Burton's Microbiology for the Health Sciences, 10th Edn. Wolters Kluwer Health. This work is licensed under a Creative Commons Attribution 4.0
10. International License to Pondicherry University which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.
11. Park K. (2017) Parks Text Book of Preventive and Social Medicine, Banarsidas Bhanot Publishers.

NOTE FOR PAPER SETTING:

The paper shall comprise 3 units having 50 marks weightage.

Internal assessment: 10 marks

The scheme for External Examination of 40 marks shall be as follows:

Weightage: 40 marks

Question paper shall have three sections (A, B and C)

Section A shall comprise of 4 questions of 2 marks each. All questions shall be compulsory.

Section B shall comprise of 4 questions of 5 marks each. All questions shall be compulsory.

Section C shall comprise of 3 Long answer type questions of 12 marks each, one from each unit. The students are required to attempt any one question.

The paper shall comprise 3 units having 50 marks weightage.

Committee members (External)

1	Prof. (Dr.) Seema Langer Head, Department of Zoology & Dean, Life Sciences, University of Jammu	
2	Dr. N. K. Tripathi, Professor (Retd.) Department of Zoology, University of Jammu	
3	Dr. Surya Partap Singh, Assistant Prof. & Head, Department of Zoology, GDC Basholi	
4	Dr. Shvetambri Jasrotia, Assistant Prof., Department of Zoology, Central University of Jammu	
5	Mr. Munish Sharma, Assistant Director Fisheries, Jammu.	
6	Col. (Retd.) Sunil Sambyal ,Biofloc Expert & Entrepreneur	