

DEPARTMENT OF MICROBIOLOGY
COURSE CURRICULUM & MARKING SCHEME

B.Sc. Part - III
MICROBIOLOGY

SESSION : 2023-24



ESTD : 1958

GOVT. V.Y.T. PG AUTONOMOUS COLLEGE,
DURG, 491001 (C.G.)

(Former Name – Govt. Arts & Science College, Durg)

NAAC Accredited Grade A⁺, College with CPE - Phase III (UGC), STAR COLLEGE (DBT)

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**Syllabus and Marking Scheme for
B.Sc. Part III
Session 2023-24**

Paper No.	Title of the Paper	Marks Allotted	
		Max.	Min.
I	Medical Microbiology and Immunology	50	17
II	Environmental, Industrial and Agricultural Microbiology	50	17
III	Lab Course	50	17
	Total	150	

02 Theory papers - 100
01 Practical - 50
Total Marks - 150

Name and Signatures

<p>Chairperson/ HOD- Dr. Pragya Kulkarni Subject Expert - Dr. Anita Mahiswar Subject Expert - Dr. Sonal Mishra VC Nominee – Dr. Prakash Saluja Industrial Representative- Shri Amitesh Mishra Member of Other Department- Dr. Ranjana Shrivastava</p>	<p>Student Nominee – Ms. Yogita Lokhande Departmental members 1. Mrs. Rekha Gupta 2. Mrs. Neetu Das 3. Ms. Anamika Sharma 4. Ms. Mrinalini Soni 5. Ms. Neetu Bhargav</p>
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SESSION 2023-24
B.Sc. MICROBIOLOGY

Programme Specific Outcomes (PSOs)

By the end of this programme, the students will be able to:

1. Recognize various kinds of prokaryotic and eukaryotic microbes and their importance
2. Explain and describe importance of organic compounds and their chemistry
3. Make clear the molecular structure of biomolecules
4. Comprehend the importance of instruments and techniques in microbiology
5. Understand concept of Medical microbiology and Immunology
6. Know the Environmental, Agricultural, Industrial insight of microorganisms

DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS

1. There shall be three sections (Section A, B, and C) in each theory paper.
2. Section A shall contain very short answer type questions (One or two line answer) or objective type questions (fill in the blank). (not multiple choice questions) Altogether 10 questions will be set from the entire syllabus, and shall be compulsory. (1X10 = 10)
3. Section B shall contain short answer type questions with the maximum limit of 150 words. Altogether 10 questions to be set i. e. Two from each unit with the internal choice. The candidates are required to solve one from each unit. (3X5 = 15)
4. Section C shall contain long answer/ descriptive type questions. The students are required to answer precisely and the answer should not exceed the maximum limit of 350 words. Altogether 10 questions to be set i.e. Two from each unit with the internal choice. The candidates are required to solve one from each unit. (5X5 = 25)
5. The students are required to study the content mentioned in the curriculum exhaustively.

Marking Scheme

Time: 03 hrs

M.M.	Section A	Section B	Section C
50	01 X 10 = 10	03X 5 = 15	05 X 5 = 25

Chairperson/ HOD- Dr. Pragya Kulkarni

Subject Expert - Dr. Anita Mahiswar

Subject Expert - Dr. Sonal Mishra

VC Nominee – Dr. Prakash Saluja

Industrial Representative- Shri Amitesh Mishra

Member of Other Department- Dr. Ranjana

Shrivastava

Student Nominee – Ms. Yogita Lokhande

Departmental members

6. Mrs. Rekha Gupta

7. Mrs. Neetu Das

8. Ms. Anamika Sharma

9. Ms. Mrinalini Soni

10. Ms. Neetu Bhargav

Session 2023-24
B.Sc. III
MICROBIOLOGY
PAPER – I

BMB 05 MEDICAL MICROBIOLOGY AND IMMUNOLOGY

Course Outcome (CO):

Upon successful completion of the course students will be able –

- ❖ To study the air born and water borne diseases
- ❖ To study the clinical diseases and their diagnosis
- ❖ To understand basic knowledge of immunity
- ❖ To learn about immunodiagnostic techniques

Unit 1: Air Borne Diseases

Air borne diseases Types: Tuberculosis, Pertussis, Diphtheria, Influenza, Small and Chicken Pox, Mumps, Measles - Symptoms, Treatment and Preventions

Unit 2: Water Borne Diseases

Concept and cause of water borne diseases, Types: Hepatitis, Dysentery, Diarrhea, Cholera, Typhoid, Symptoms, Treatment, and Preventions

Unit 3: Clinical Diseases and Diagnosis

Clinical Diseases: Diabetes, Asthma, Multiple Sclerosis, Rheumatoid Arthritis, Cancer, Symptoms, Treatment and Preventions

Unit 4: Basic Concept of Immunity

Immune System, Structure and Function of the cells, tissues and organs of immune system, Types of immunity, Humoral and Cell mediated, Innate, Acquired immunity, Antigen Antibody: types, properties, Hapten, Adjuvants, Immunoglobulins: Structure, types, Properties and their function, Theory of Antibody Production

Unit 5: Immuno Disease Diagnosis

Methods based on Ag- Ab interaction- Precipitation, Agglutination, ELISA, RIA, Immuno-electrophoresis, PCR based diagnosis method for infectious diseases.

Name and Signatures

 Chairperson/ HOD	 Subject Expert	 Subject Expert	 VC Nominee
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Industrial Representative	Member of Other Department	Student Nominee
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Departmental members:

			
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Recommended Books

1. Molecular Biology, A.V.S.S Sambamurthy., Narosa Pub.
2. Biochemistry, C.B Powar. and Chatwal, Himalaya Pub.
3. Molecular Biology, M.P Arora., Himalaya Pub.
4. Gene VII, Benzamin Lewin
5. A text book of Microbiology – R.C. Dubey and D.K. Maheshwari, S. Chand and company
6. Biotechnology, B.D Singh.,Kalyani Pub.
7. A text book of Biotechnology, R.C Dubey., S. Chand & Company Pub.
8. Biotechnology, S.N Jogdand.,Himalaya Pub.

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B.Sc. III
MICROBIOLOGY
PAPER – II

BMB 06 ENVIRONMENTAL, INDUSTRIAL AND AGRICULTURAL MICROBIOLOGY

Upon successful completion of the course students will be able –

- ❖ To understand the basics of relation between environment and microorganisms
- ❖ To compare different habitats of microorganisms
- ❖ To recognize microbial interactions in soil
- ❖ To know the industrial uses of microorganisms
- ❖ To be aware of the agricultural importance of microorganisms

Unit – 1: Air Microbiology

Basics of Aerobiology, Microbes in atmosphere, Source of microorganism in air, Droplet nuclei, Infectious dust, and Bio-aerosol, Factors affecting microbial survival in air, Sampling, Collection and Isolation of microbes from air.

Unit – 2: Water microbiology

Basic concept, Water zonation, Eutrophication, Microbial community in natural water. Determining the quality of water bacteriological evidence for fecal pollution, Indicator of fecal pollution. Water purification methods, Disinfection of potable water supply.

Unit – 3: Soil microbiology

Soil as an environmental culture medium, Microbes of soil. Brief account of Microbial Interaction- Symbiosis, Mutualism, Commensalism, Competition, Predation, Parasitism. Microbiological examination of soil. Rhizosphere- concept and role of microbes, Rhizosphere and non-rhizosphere micro-flora. Mycorrhiza.

Unit – 4: Industrial microbiology

Introduction and brief history and scope, Important microbes in various industries. Fermentation- definition, types- aerobic and anaerobic, Batch and SSF, Important products Bread, Cheese, Vinegar, Fermented dairy product and Oriental fermented food involving microbes. Microbial cells as food. SCP- Mushroom cultivation, Production of alcohol and fermented beverages, Beer and Wine.

Unit – 5: Agricultural microbiology

History of agricultural microbiology; Microbes and their importance in maintenance of soil, Biogeochemical cycles, Role of microbes in maintaining the fertility of soil. Biofertilizers- bacterial, azotobacter and vermiform compost. Soil micro-organism- association with vascular plants- Phyllosphere, Rhizobium, Rhizoplane associative nitrogen fixation. Bio-fertilizers- Cyanobacterial and Azolla

Name and Signatures

Chairperson/ HOD

Subject Expert

Subject Expert

VC Nominee

Industrial Representative
Departmental members:

Member of Other Department

Student Nominee

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Text books recommended:

1. Environmental Microbiology, Banwarilal, CyberTech. Pub.
2. Introduction to Soil Microbiology, Alexander Martin, Wiley Eastern Press.
3. Agricultural Microbiology, Rangaswami G. and Bagyaraj D.J., Prentice Hall India Ltd.
4. A text book of Microbiology – P. Chakraborty, New central book agency (P) Ltd. Kolkata.
5. General Microbiology I & II - C.B. Powar and H. F. Dagainawala, Himalaya Publishing House
6. Bioremediation by KH Baker and D. Herson.

SESSION 2023-24
B.Sc. PART III
MICROBIOLOGY

BMBL 03 LIST OF PRACTICAL EXERCISES

Upon successful completion of the lab course students will be able –

1. To understand the possible sources of microbial infections
2. To be familiar with the immunogenic reactions
3. To get insight of Microbial –Environmental interactions
4. To recognize agricultural and industrial importance of microorganisms

List of Exercises

1. Preliminary identification of enteric pathogens using Triple Sugar Iron Agar (TSIA) medium
2. Study of common air born and water born diseases
3. Demonstration of antigen Antibody interaction by slide agglutination reaction
4. Identification of cells of immune system
5. WIDAL test
6. Determination of BOD and COD of water samples
7. Isolation of Aeromycoflora by Petriplate Exposure Technique
8. Demonstration of centrifugal impact air sampler
9. Microbial assessment of water quality (Presumptive test and confirmative test)
10. Water Analysis for total bacterial population by SPC method
11. Isolation and enumeration of Rhizospheric and Non-rhizospheric fungi from soil and estimation of R:S ratio
12. Microscopic observation of root colonization by VAM Fungi
13. Isolation of Rhizobium from root nodules of leguminous plants
14. Study the industrial importance of microorganisms

Marking Scheme

Q. 1	Q.2	Q. 3	Q.4	Spotting	Sessional	Viva	Total
10	05	10	05	10	05	05	50

Name and Signatures

**Chairperson/ HOD
Nominee**



Subject Expert



Subject Expert



VC

Industrial Representative

Member of Other Department

Student Nominee

Departmental members:




