Chhindwara University, Chhindwara (M.P.)

SYLLABUS OF (Class) ---M. Sc. I---SEMESTER SYSTEM

SEMESTER-I (Session-2019-20)

Syllabus opted by the board of studies in ---Microbiology---Chhindwara University

in the meeting held on 02/11/2019

(पूर्व में RDVV जबलपुर के संबंधित प्राप्त महाविद्यालयों के लिये)

Session	Course	Title of papers	Max. Marxs Theory/CCE	Max. Marxs Practical	Minimum Passing Marxs Theory/CCE/* Practical	Total Marxs
First	Paper-I	Bacteriology	35/15	50+50 = 100	12/05/20	50
	Paper-II	Virology	35/15		12/05/20	50
	Paper-III	Mycology	35/15	50+50 = 100	12/05/20	50
	Paper-IV	Microbial Biochemistry	35/15		12/05/20	50
	Paper-V(if)	Project/Seminar/Assignment	50	–	20.	
					140.	350

Board of Studies:

I. Chairman- 2/11/19

II- Subject Expert –

1. 2/11/19

2.

3.

4.

5.

* CCE - 4 written test based on each course (Each of 15 marks)

Class M. Sc. I Microbiology

SEMESTER-I

Paper I/ ~~II/ III/ IV/ V~~

Paper Title(in English) Bacteriology

Paper Title(in Hindi) बैक्टीरियोलॉजी

MM-

Course Rationale (पाठ्यक्रम तर्काधार)

Unit- I

History, scope and development of Bacteriology, sterilization, isolation, enrichment, pure culture and staining techniques, systematic study of Bacteria, Morphological, physiological, biochemical and serological studies, Genetic characterization, identification & classification chart.

Unit- II

Habitat, structure, Reproduction and classification of Bacteria (Morphological, biochemical, serological, chemical and molecular aspects), Actinomycetes, Mycoplasma, Rickettsiae, chlamydiae, and their significance.

Unit- III

The photosynthetic bacteria, cyanobacteria, Green bacteria, Halobacteria and their economic importance, Methanogenic bacteria and their significance, chemoautotrophs, and Methylotrophs, Nitrifying bacteria, Sulphur oxidizers, Iron bacteria, hydrogen bacteria, and their

nit- IV Enterobacteriaceae, and related organisms, their morphological & physiological characters, Genetic interrelationship, Taxonomic sub-division and their importance in human health. Myxobacteria, Cytophaga group, filamentous & gliding chemoheterotrophs, and filamentous sulphur oxidizing bacteria.

Unit- V Gram positive spore forming bacteria, Unicellular endospore formers – Bacillus, Clostridia, Miscellaneous bacteria, lactic acid bacteria, Micrococci, Corynebacteria, Mycobacteria.

Suggested Readings :-

1.
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4.
5.
6.
7.

The scheme of examination and the allotment of marks shall be as under

Sections/Part	Questions Type	Marks Distribution	Remark
Section -A	Objective Type Questions(At least one question to be set from each unit)	1x = Marks	
Section –B	Short Answer Type Question(Two questions to be set from each unit and one from each unit to be attempted)	2x = Marks	
Section –C	Long Answer Type Question(Two questions to be set from each unit and one from each unit to be attempted)	5x = Marks	
	Total	Marks	

Board of Studies:

1. Chairman-

II- Subject Expert – Prof A.K. Pandey

Chhindwara Vishwavidalaya, Chhindwara

Syllabus Prescribed for the examination of M.Sc. I Semester

Microbiology Paper I -A

Session 2019-20

Paper Title – Bacteriology

MM - 35 + 15 CCE

Unit- I :- History, scope and development of Bacteriology, sterilization, isolation, enrichment, pure culture and staining techniques, systematic study of bacteria; morphological, physiological, biochemical and serological studies, genetic characterization, identification & classification chart.

Unit- II :- Habitat, structure, reproduction & classification of bacteria (morphological, biochemical, serological, chemical and molecular aspects), Actinomycetes, Mycoplasma, Rickettsiae, Chlamydiae and their significance.

Unit- III :- The photosynthetic bacteria; cyanobacteria, green bacteria, halobacteria and their economic importance. Methanogenic bacteria and their significance. Chemoautotrophs and Methylotrophs; nitrifying bacteria, sulfur oxidizers, iron bacteria, hydrogen bacteria and their economic importance.

Unit- IV :- Enterobacteriaceae and related organisms, their morphological & physiological characters, genetic interrelationship, taxonomic sub-division & their importance in human health. Myxobacteria, cytophage group, filamentous & gliding chaemoheterotrophs & filamentous sulphur oxidizing bacteria.

Unit- V :- Gram positive spore forming bacteria; unicelluar endospore formers- Bacillus, Clostridia. Miscellaneous bacteria; lactic acid bacteria, Micrococci, Corynebacteria, Mycobacteria.

2-11-19

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Total		Marks	

Board of Studies: 1. Chairman- Prof. A.K. Pandey

II- Subject Expert –

1 Dr. A.K. Ayachi

2 Dr. Nikhil Kanungo

Chhindwara Vishwavidalaya, Chhindwara

Syllabus Prescribed for the examination of M.Sc. I Semester

Microbiology Paper II -A

Session 2019-20

Paper Title – Virology

MM - 35 + 15 CCE

Unit- I :- General virology: History and development of virology, origin, distinctive properties, ultrastructure and chemistry of viruses. virus related agents (viroids, prions), significance of viruses.

Unit- II :- General methods for isolation, identification, characterization and cultivation of viruses: Methodology for isolation, adsorption, One-step growth and burst size of virus. Determination of titre value, isolation of phage resistant strain, cultivation and maintenance of plant, animal and bacterial / cyanobacterial viruses. identification of viruses by physical, chemical and serological techniques.

Unit- III :- Bacterial/ cyanobacterial viruses: Structure and multiplication of lytic and lysogenic bacteriophage.Significance of lysogeny. Brief account of M13, Mu, T4 and λ, history, structure, genetics and life cycle of cyanophages, significance of bacteriophages and cyanophages.

Unit- IV :- Plant viruses: classification and nomenclature, structure and multiplication of plant viruses with special reference to TMV, cauliflower mosaic virus, effect of viruses on plants. Some common viral diseases of plants (TMV, CMV, leaf Curl of papaya). Transmission of plant viruses and control of viral diseases of plants.

2.11.19

Unit- V :- Animal viruses: Classification and nomenclature of animal and human viruses. Brief account of Adeno-, Herpes, Hepatitis, HIV and other oncogenic viruses. Prevention, treatment and control of viral diseases. Viral vaccines including DNA vaccines and interferons.

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Microbiology Paper III -A

Session 2019-20

Paper Title – Mycology

MM - 35 + 15 CCE

Unit- I :- Status of fungi in the living world, general features of fungi and fungus like organisms; recent trends in the classification of fungi; physiology and growth of fungi; nutritional and environmental factors affecting growth; saprotrophs, parasites and mutualistic symbionts; physiology of reproduction in fungi, phylogeny of fungi.

Unit- II :- Fungal diversity-major taxonomic group, structure, reproduction, life cycle and significance of the following representatives: i) Gymnomycota-general account – cellular slime moulds (Dictyostelium), plasmodial slime moulds (Myxomycetes). ii) Mastigomycota- Coelomomyces, Lagenidlum, Achlya, Phytophthora, Peronospora, Plasmodiophora. iii) Amastigomycota-Zygomyocotina- Mucor, Syncephalastrum, Blakeclea, Cunninghamella, Entomophthora.

Unit- III :- Fungal diversity contd. structure, reproduction, life cycle and significance of the following representatives: i) Ascomycotina- Taphrina, Emericeilla, Chaetomium, Morchella, Neurospora, Claviceps, Erysiphae. ii) Basidiomycotina- Puccinia, Melamspora, Ustilago, Polyporus, Lycoperdon, Ganoderma. iii) Deutromycotina- Fusarium, Cercospora, Curvularia, Beauveria, Microsporum, Phoma, Collectotrichum.

Unit- IV :- Fungal genetics: i) Life cycle and sexual process in fungi; structure and organization of fungal genomes (mitochondrial genes, plasmids and transposable elements, virus and viral genes). ii) Genetic variations in fungi- nonsexual variations-haploidy, heterokaryosis, parasexuality; sexual variations- mating or breeding systems- homothallism and heterothallism, mutation, physiological specialization; strain improvement.

Unit- V :- Fungi and biotechnology: production of alcoholic beverages, antibiotics, organic acids, ergot alkaloids; the cultivation of fungi for food-mushrooms, myco protein and mycofoods; role of fungi in agriculture and forestry- mycorrhizae and their application, mycopesticides, mycotoxins, conservation of fungal germplasm.

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Microbiology Paper IV -A

Session 2019-20

Paper Title – Microbial Biochemistry

MM - 35 + 15 CCE

Unit- I :- Structure of water and its solvent properties. Acid base pH and buffer. Bi-and polyprotic buffer. Free energy and spontaneity of reactions. ATP and other phosphrylated compound with their free energy of hydrolysios, phosphoryl group transfer, biological oxidation reductions reaction; coupled reaction and oxidative phosphorylation and uncouplers.

Unit- II :- Enzyme classification, specificity, active site, Enzyme kinetics Michealis Menton equation, determination of kinetic parameters. Bi-substrate reaction and their kinetics. Enzyme inhibition and kinetics. Allosteric enzyme, kinetics, and allosteric regulation of phosphofructo kinase.

Unit- III :- Structure and chemistry of macromolecules: proteins, carbohydrates and lipids, protein folding; structure and chemistry of bimolecules such as antibiotecs; pigments, vitamins as coenzymes; lipid analysis by GLC and mass spectrometry; oligosaccharide and polysaccharide analysis.

Unit- IV :- Biosignaling- Molecular mechanism of signal transduction; gated ion channels, nicotinic- acetyl choline receptor; receptor enzyme- the issulin receptor; G proteins and cyclic AMP; membrane treansport- biomembrane, nutrient transport across membranes, active and passive diffusion, symport,

antiport and unport and uniport, Na+, k+ pumps and their metabolic significance.

Unit- V :- Chromatographic technique- technique- paper and TLC, gel filtration, ion-exchange, affinity; HPLC SDS-PAGE, isoelectric focusing, Westerns blotting protein sequencing, mass spectrometry, MALDI- TOF- MS.

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