

**Govt Bilasa Girls PG College, Bilaspur CG**

**Syllabus 2018-19  
CERTIFICATE COURSE**

**INDUSTRIAL MICROBIOLOGY**

PAPER: FIRST

MAX. Marks: 50

(Fundamentals of industrial microbiology, Tools and Techniques)

Unit -1

History and development of Microbiology Contributions of Antony Von Leeuwenhoek, Louis Pasteur, Robert Koch, Edward Jenner, Waksman Alexander Fleming

Unit-2

General Characteristics and structure of Bacteria, Cyanobacteria, Fungi. Actinomycetes, Mycoplasma, Viruses.

Unit-3

Microscopy-Invention of Microscope, Compound microscope, Dark field, Fluorescent, Phase contrast and Electron microscope.

Unit-4

Methods of sterilization, culture media, and isolation techniques. Methods of preservation of microbial culture.

## Unit-5

Basic principles and uses-pH meter, Densimeter, Colorimeter, Spectrophotometry, Fluorometry, Centrifugation-principles and applications Uses of fermentation

## PRACTICAL

The practicals will, in general, be based on the prescribed syllabus in the theory and the candidates will be required to show the knowledge of the following

1. Preparation of media, autoclaving and sterilization of glasswares
2. Isolation of phytopathogens.
- 3 Isolation of microbes from soil and water:-Bacteria, fungi and Algae
- 4 Purification of microbial cultures.
- 5 Camera Lucida Drawing
6. Standard Plate count.
7. Haemocytometer
8. Chromatographic techniques: Separation of amino acid by TLC and Paper Chromatography
9. Measurement of pH of fruit juices
10. Estimation of carbohydrates by colorimeter.

Recommended books:

1. General microbiology, Vol II by Powar and Daginawala.
2. Microbiology by Pelczar, Reid and Chan
3. General microbiology by Davis and Harper.
4. Introductory Microbiology by Alexopoulos and Mims 5. Microbiology by P. D. Sharma

## PAPER SECOND

MAX Marks: 50

(MOLECULAR BIOLOGY, BIOCHEMISTRY AND MICROBIAL GENETICS)

### UNIT-1

Nucleic acids-Structure of DNA and RNA, Replication of DNA, Synthesis of RNAs and their types, Genetic codes and Concept of genes.

### UNIT-2

Molecular Biology Translation and Protein Synthesis, Operon Concept, cAMP, CAP (Catabolic activator proteins), Gene Expression in Prokaryotes, Lac Operon Gene regulation in Eukaryotes (Britton-Davison model of Gene Expression)

### UNIT-3

Genetic Recombination in Bacteria - Transformation, Transduction, Conjugation, Genetic Mapping Extra Chromosomal genetic material Plasmids, Cosmids, Transposons, Overlapping genes, Silent genes and their evolutionary significance Mutation - Molecular mechanism of mutation, chemical and physical Mutagens, Repair of mutation damage.

#### UNIT-4

Biochemistry Classification of carbohydrates, Chemical structure and Properties of Starch, Cellulose, Glycogen, Synthesis of Purine and Pyrimidines Lipids - Saturated and unsaturated fatty acids, Biosynthesis of Fatty acids, Distribution and Function of lipids in microbes, Degradation of lipids by alpha, beta oxidation and co oxidation, lipid peroxidation.

#### UNIT-5

Enzymes - Classification, Co-enzymes, Co factors, Mechanism of enzyme action, Competitive and non competitive inhibition. Allosteric regulation of enzymes, Isoenzymes, factors contributing to catalytic efficiency of enzymes Amino acids-Classification of essential amino acids based on polarity. Acid-base properties and solubilities. Amino acid sequencing of proteins; Primary, Secondary and tertiary Structure.

#### PRACTICALS

The practicals will, in general, be based on the prescribed syllabus in the theory and the candidates will be required to show the knowledge of the following:

1. Isolation of antibiotic resistant bacteria.
2. Estimation of Alkaline phosphatase activity.
3. Measurement of alpha amylase activity in extra cellular fraction of microbial culture
- 4 Estimation of glycogen in bacterial cells
5. Measurement of cellulose activity by Viscometric technique.
6. Determination of cellulase and amylase activity in reducing sugar assay test.
7. Isolation of DNA.

Recommended books:

1. General microbiology, Vol I by Powar and Duginawala.
- 2 Microbial Biochemistry by Moat
3. Principles of Biochemistry by A. L Lehninger,
4. Outline of Biochemistry by Cohn and Letninger.
5. Biochemistry by Harper.
6. Text book of Biochemistry by Rama Rao.
7. Text book of Biochemistry by O. P. Agrawal.

**Syllabus 2017-18**  
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Unit-2

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**CERTIFICATE COURSE**

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**Syllabus 2015-16**  
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