

Syllabus for Certificate Course in
Microbiological Laboratory Techniques (CMLT)

In the
Faculty of Science & Technology

Submitted to
Kaviyatri Bahibai Chaudhari North Maharashtra University
Jalgaon

Submitted by
Department of Microbiology
PSGVP Mandal's Arts, Science and Commerce College
SHAHADA 425409 Dist Dhule

w.e.f. AY 2019-2020

Duration of Course - 1 Year

Eligibility - 12th Science Passed

Paper Pattern

Paper-I(General microbiology)	-100 Marks
Paper-II(Genetics and Medical Microbiology)	-100 Marks
Practical	-100 Marks

Examination Pattern

	Internal marks	External marks	Total
Paper-I	40	60	100
Paper-II	40	60	100
Practical	40	60	100

Total-300 Marks

S.S.V.P.S.'s L.K.Dr.P.R.Ghogrey Science College, Dhule

Department of Microbiology

Syllabus For

**Certificate Course in Microbiological
Laboratory Techniques**

(With Effect From July 2007)

Syllabus For Certificate Course In Microbiological Laboratory Techniques

Paper-I General Microbiology 90L

Chapter-I Introduction to Microbiology (15)

- Scope of microbiology.
- History of Microbiology.
- The Characterization , Classification and Identification.
- Microscopic examination of microorganisms.

Chapter-II General Characteristics and Significance of following microorganisms. (20)

- Bacteria
- Archaeobacteria.
- Fungi.
- Protozoa.
- Viruses.
- Actinomycetes.

Chapter-III Pure Culture Techniques (20)

- The Streak Plate technique.
- The Spread Plate technique.
- Pour Plate technique.
- Serial dilution technique.
- Enrichment Culture technique.
- Use of Selective media.
- Use of Differential media.

Chapter-IV Maintenance and Preservation of cultures (20)

Maintenance methods for stock culture.

Microorganisms in continuous metabolism state.

- Periodic transfer to fresh media.
- Overlaying cultures with mineral oil.
- Storage in sterile soil.
- Storage in saline suspension.

Microorganisms in suspended metabolic state.

- Drying in Vacuum.
- Lyophilization (Freeze drying).
- Use of Liquid nitrogen.
- Storage in Silica gel.

Chapter-V Control of Microorganisms (15)

- Control of microorganisms by Physical agents.

- Control of microorganisms by Chemical agents.
- Antibiotics and Other Chemotherapeutic agents.

Chapter-I Nucleic Acid (15)

- Structure of DNA.
- Types of DNA.
- RNA and its types.
- Comparative account of DNA and RNA.
- Concept of Gene.
- Genetic code and its properties.

Chapter-II DNA damage and Repair mechanism. (15)

- Types of DNA damage.
- Photoreactivation.
- Dark Repair.
- Excision Repair.
- SOS Repair.

Chapter-III Techniques in Genetics. (15)

r-DNA technology-Concept and Application.

Blotting techniques.

- Northern blotting.
- Southern blotting.
- Western blotting.

Construction of gene library.

Chapter-IV Introduction to Medical Microbiology. (15)

- Infection and Diseases.
- Sign, Symptoms and Syndromes.
- Portal of entry of pathogen.
- Mode of disease transmission.
- Epidemiology.
- Laboratory diagnosis.
- Prophylaxis and Treatment.

Chapter-V Antimicrobial agents. (15)

- Strategies for evaluation of chemotherapeutic agents.
- Spectrum of activity.
- Action.
- Antifungal agents- Polyenes and Griseofulvin.
- Antiviral agents- Amantadine and Zidoviridine.
- Antiparasitic drugs- Quinine and Metrinidazole.
- Mechanism of drug resistance.

Chapter-VI Study of Diseases.

(15)

- Skin diseases- Leprosy.
- Respiratory system- Tuberculosis.
- Gastrointestinal tract- Cholera.
- Genitourinary tract- Urinary tract infection.
- Central Nervous system- Poliomyelitis.
- Immune system- AIDS.
- Respiratory disease- FMD.

PRACTIAL COURSE

120 Lectures

- 1) Introduction to laboratory instruments, Incubator, water bath, autoclave, hot air oven, Laminar Air Flow, Shaker, pH meter, centrifuge, spectrophotometer, Weighing Balance, Refrigerator.
- 2) Use and care of compound microscope
- 3) Techniques for isolation of microorganisms
 - a) Streak plate
 - b) Pour plate
 - c) Spread plate
- 4) Staining Techniques
 - a) Monochrome staining
 - b) Negative staining
 - c) Gram staining
 - d) Acid-fast staining
 - e) Spore staining(Shaffers and Fultons method)
 - f) Flagella (Loeffler's/Bailey's method)
- 5) Cultivation of Fungi/Actinomycetes by slide culture technique
- 6) Determination of microflora of air
- 7) MBRT test
- 8) Blood group test
- 9) Antibiotic sensitivity test
- 10) BT and CT test for blood
- 11) Determination of haemin crystals from human blood
- 12) Sugar estimation by DNSA method.

References :-

- 1) Pelczar M.J., Chan ECS, Krieg N>R.(1988) 5th edition Microbiology Tata Macgraw Hill Pub. Co. Ltd. New Delhi.
- 2) Stainer R.Y. Ingram J.L., Wheelis M.L., Painter R.K.(1995) General Microbiology 5th edition Tata Mac Graw Hill Publication Co. Ltd., New Delhi
- 3) Modi H.A. Elementary Microbiology Vol. 1 Ekta Pub.
- 4) Medical Microbiology, R Anant Narayan
- 5) Aneja K.R.(1996) Experiments in Microbiology, plant pathology, tissue culture and mushroom cultivation 2nd edition. WishwaPrakashan New Delhi
- 6) Harley J.P. and Prescott L.M.(1996) Laboratory exercises in microbiology 3rd edition WCB/ M ac Graw Hill Pub.