S.K.R. & S.K.R. Govt. College for Women (Autonomous), Kadapa.
Reaccredited with 'B' Grade by NAAC
Y.S.R.Kadapa District – 516001, Andhra Pradesh

DEPARTMENT OF MICROBIOLOGY

Syllabus-Semester I & II

SKR & SKR GOVT. COLLEGE FOR WOMEN(A) - KADAPA

I B.Sc -SEMESTER-I: MICROBIOLOGY SYLLABUS 2020-2021

Paper-I : Microbiology

Introduction To Microbiology & Microbial Diversity

TOTAL HOURS : 48 **CREDITS : 4**

UNIT - I **12 hours**

History and developments in microbiology.
Contributions of Anton von Leeuwenhoek, Edward Jenner, Louis Pasteur, Robert Koch, Ivanowsky. Importance and applications of microbiology.

Classification of microorganisms- Whittaker's five kingdom classification, Bergey's Manual of Systematic Bacteriology

UNIT-II
10 hours

Methods of sterilization: Physical methods – Dry heat, moist heat, radiation methods(UV rays, Gamma rays), filtration methods, Chemical sterilization and disinfection methods.
Microbial cultures: Concept of pure culture, Methods of pure culture isolation, pure culture (streak plate, pour plate and spread plate), single cell isolation methods. Preservation of microbial cultures: subculturing, overlaying cultures- mineral oils, lyophilization, and culture storage at low temperature.

UNIT-III:
10 hours

Staining Techniques - Simple and Differential staining techniques.

Principles of microscopy - Bright field and Electron microscopy (SEM and TEM).

Microbial culture media-Natural basal media, differential media, enriched media, enrichment media, selective and transport media

UNIT-IV:
10 hours

Microbial growth: Bacterial growth curve
measurement of growth: (Direct methods: viable plate counts, membrane filtration) most probable number;
Batch and continuous Synchronous and Diauxic growth.
General characteristics of Bacteria, Archaea, Mycoplasmas, Cyanobacteria, Fungi, and viruses.

UNIT-V **10 hours**

Cell structure of micro orgonisms- Cell wall of bacteria (Gram positive and gram negative) and
Cell wall of fungi and yeasts-
Morphology and chemical composition of bacteria,
Cell wall lacking bacteria (Mycoplasma).
Economic importance of algae and fungi.

MICROBIOLOGY PRACTICAL- I: INTRODUCTION TO MICROBIOLOGY AND MICROBIAL DIVERSITY

List of experiments: 48hrs

1. Microbiology Good Laboratory Practices and Biosafety.
2. Preparation of culture media for cultivation of bacteria
3. Cultivation of Bactria and fungi
4. Sterilization of media using Autoclave
5. Sterilization of glassware using Hot Air Oven
6. Light compound microscope and its handling
7. Microscopic observation of bacteria (Gram +ve bacilli and cocci, Gram -ve bacilli), Cyanobacteria, Algae and Fungi.
8. Simple staining
9. Gram's staining
10. Hanging-drop method.
11. Isolation of pure cultures; streak plate /pour plate method.
12. Preservation of bacterial cultures.

SUGGESTED READING:

• • Pelczar, M.J., Chan, E.C.S. and Kreig, N.R. (1993). Microbiology. 5th Edition, Tata Mc

Graw Hill Publishing Co., Ltd., New Delhi.

• • Dube, R.C. and Maheswari, D.K. (2000) General Microbiology. S Chand, New Delhi.

Edition), Himalaya Publishing House, Mumbai.

Power, C.B. and Daginawala, H.F. (1986). General Microbiology Vol I & II

• Prescott, M.J., Harley, J.P. and Klein, D.A. (2010). Microbiology. 5th Edition, WCB Mc

GrawHill, New York.

• Reddy, S.M. and Reddy, S.R. (1998). Microbiology □ Practical Manual, 3 rd Edition, Sri

Padmavathi Publications, Hyderabad.

• Singh, R.P. (2007). General Microbiology. Kalyani Publishers, New Delhi.

• Stanier, R.Y., Adelberg, E.A. and Ingram, J.L. (1991). General Microbiology, 5th Ed.,

Prentice Hall of India Pvt. Ltd., New Delhi.
• Microbiology Edited by Prescott

• Jaya Babu (2006). Practical Manual on Microbial Metabolisms and General

• Microbiology. Kalyani Publishers, New Delhi.

• Gopal Reddy *et al.*, Laboratory Experiments in Microbiology

SKR&SKR GOVT. COLLEGE FOR WOMEN(A) - KADAPA

I B.Sc -SEMESTER-II : MICROBIOLOGY SYLLABUS 2020-2021

Paper-II : MICROBIAL PHYSIOLOGY AND BIOCHEMISTRY

PAPER-II : MICROBIAL BIOCHEMISTRY & METABOLISM

TOTAL HOURS: 48 **CREDITS: 4**

UNIT-I **No. of hours: 8**

Microbial nutrition: Classification of micro organisms based on nutrients (carbon, nitrogen,
other energy and electron sources).
Autotrophs, heterotrophs, mixotrophs, Phototrophs (Photosynthetic pigments).

UNIT-II **No. of hours: 10**

Aerobic respiration - Glycolysis, HMP path way, ED path way, TCA cycle, Electron transport, oxidative and substrate level phosphorylation. Kreb'scycle,
glyoxylatecycle, hexose monophosphate (HMP) shunt, gluconeogenesis.
Anaerobic respiration Fermentation,
Alcohol and lactic acid fermentations.
Nitrate and sulphate respiration.
Outlines of oxygenic and anoxy genic photosynthesis in bacteria.

UNIT-III **No. of hours: 10**

General charecters , outline classification of Carbohydrates (Mono,Di and Polysaccharides),
Lipids- General charecters–Triglycerides, phospholipids, glycolipids and waxes.

General charecters,classification,structure and function of amino acids,Charecterization of proteins and classification (primary,secondary,tertiary and quatemary),denaturation of proteins,hydrolysis,protein sequencing methods.

UNIT – IV: **No. of hours: 10**

Nucleic acid types, base composition,nucieosides,nucleotides, Structure and functions of DNA

(Types of DNA i.e. B, C, D and Z) and RNA (types i.e. m-RNA, r-RNA, t-RNA), Chargaff principles, Denaturation, renaturation and hybridization- cot 1/2 values.

UNIT- V **No. of hours: 10**

Structure, Nomenclature and classification of Enzymes, Kinetics (Michaelis – Menten equation),

Factors effecting on enzyme activity (PH, tempareture,concentration) catalised reactions (Lock &Key, Induced Fit). Co-enzymes, co-facters.

MICROBIOLOGYPRACTICAL-II : MICROBIAL PHYSIOLOGY AND BIOCHEMISTRY

LIST OF EXPERIMENTS

TOTAL HOURS: 48 **CREDITS: 2**

1. Qualitative Analysis of Carbohydrates
2. Qualitative Analysis of Aminoacids
3. Colorimetric estimation DNA by diphenylamine method.
4. Estimation of RNA by Orcinol method.
5. Colorimetric estimation of proteins by Biuret/Lowry method
6. Bacterial growth curve.
7. Estimation of CFU count by spread plate method/pour plate method
8. Factors affecting bacterial growth – pH.
9. Factors affecting bacterial growth – Temperature.
10. Factors affecting bacterial growth –Salts