



# SHREE H. N. SHUKLACOLLEGE OF SCIENCE

(AFFILIATED TO SAURASHTRA UNIVERSITY)

Shree H.N. Shukla College Campus Nr. Lalpari lake, Behind old Marketing Yard,  
Amargadh, Bhichari, Rajkot-360001, Ph. No-9727753360

## SAURASHTRA UNIVERSITY, RAJKOT

### SYLLABUS FOR MICROBIOLOGY SEMESTER - II

(With effect from June 2019)

#### MB-201 BASICS OF BIOCHEMISTRY AND MICROBIAL CONTROL (THEORY)

##### UNIT 1: REVIEW OF BASIC BIOCHEMISTRY

- 1.1 Introduction to Atoms, Elements & Molecules
- 1.2 Major Chemical bonds in biological system: Ionic Bonds, Covalent Bonds, Hydrogen Bonds, Van der Waals interactions, Hydrophobic interactions
- 1.3 Introduction and importance of to pH
- 1.4 Major Chemical reactions: Acid Base, Redox, Condensation-Hydrolysis Reactions
- 1.5 Water and its important properties

##### REFERENCE BOOKS (SEMESTER 2 UNIT 1)

1. Atlas. R.M., Microbiology, 2<sup>nd</sup> Edition. Wm. C. Brown Publishers
2. Satyanarayana. U., Biochemistry, Books and allied Pvt. Ltd.
3. Mathew, Van Holde & Ahern, Biochemistry, 3<sup>rd</sup> Edition. Pearson Education (Singapore) Pte. Ltd. India Branch, New Delhi

##### UNIT 2: INTRODUCTION TO BIOMOLECULES

(Credit-0.8, Teaching Hours-12, Marks-14)

- 2.1 Introduction and types of Biomolecules
- 2.2 Classification, Structures and Biological function of Carbohydrates
- 2.3 Classification, Structures and Biological function of Lipids
- 2.4 Classification, Structures and Biological function of Proteins
- 2.5 Classification, Structures and Biological function of Nucleic acids

##### REFERENCE BOOKS (SEMESTER 2 UNIT 2)

1. Atlas. R.M., Microbiology, 2<sup>nd</sup> Edition. Wm. C. Brown Publishers
2. Satyanarayana. U., Biochemistry, Books and allied Pvt. Ltd.
3. Mathew, Van Holde & Ahern, Biochemistry, 3<sup>rd</sup> Edition. Pearson Education (Singapore) Pte. Ltd. India Branch, New Delhi.

##### UNIT 3: ENZYMES

- 3.1 Definition and Chemical & Physical Properties of Enzymes
- 3.2 Classification and Nomenclature of Enzymes
- 3.3 Enzyme activity: Nature & Mechanism of enzyme activity, Inhibition of enzymes action
- 3.4 Mechanism and Regulation of Enzymes Activity and Enzymes Synthesis
- 3.5 Differences between Prokaryotic & Eukaryotic Enzyme Regulation

##### REFERENCE BOOKS (SEMESTER 2 UNIT 3)

1. Pelczar, M.J., Chan E.C.S., Krieg, N.R., Microbiology, 5<sup>th</sup> Edition. Tata McGraw Hill Publication Co. Ltd. New Delhi.
2. Powar and Dagainawala, General Microbiology Vol-I. Himalaya Publishing House, Mumbai.
3. Satyanarayana. U., Biochemistry, Books and allied Pvt. Ltd.

##### UNIT 4: CONTROL OF MICROORGANISMS BY PHYSICAL AND CHEMICAL AGENTS

- 4.1 Fundamentals of Microbial Control Principle, Types and Definition of Sterilization, Disinfectant, Antiseptic, Sanitizer, Germicide, Bactericide and Bacteriostasis.
- 4.2 Characteristics, Evaluation and Selection of Ideal antimicrobial agent
- 4.3 Physical Agents of Microbial Control – High Temperature, Low temperature, Desiccation, Osmotic Pressure, Radiation, Ultraviolet lights, X- rays, Gamma rays, Cathode rays, surface tension and interfacial tension, filtration.
- 4.4 Chemical Agents of Microbial Control – Phenol and phenolic compound, Alcohol, Halogen, Heavy metals and their compounds, Dyes, Detergents, Quaternary ammonium compounds, Aldehydes, Gaseous sterilization
- 4.5 Phenol Coefficient Method for the evaluation of chemical antimicrobial agents



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## REFERENCE BOOKS (SEMESTER 2 UNIT 4)

1. Pelczar, M.J., Chan E.C.S., Krieg, N.R., Microbiology, 5th Edition. Tata McGraw Hill Publication Co. Ltd. New Delhi.
2. Powar and Daginawala, General Microbiology Vol-I. Himalaya Publishing House, Mumbai.
3. Purohit, S.S., Microbiology-Fundamentals and Applications-6th Edition, Agrobios Publications, Delhi.

## UNIT 5: ANTIBIOTICS AND THEIR MODE OF ACTION

- 5.1 Chemotherapeutic agents and Chemotherapy
- 5.2 Characteristics of ideal chemotherapeutic agent
- 5.3 Antibiotics and their mode of action: Inhibition of cell wall synthesis, Damage to cytoplasmic membrane, Inhibition of nucleic acid and protein synthesis, Inhibition of specific enzyme system
- 5.4 Antifungal, antiviral and antitumor chemotherapeutic agents
- 5.5 Nonmedical uses of antibiotics

## REFERENCE BOOKS (SEMESTER 2 UNIT 5)

1. Atlas. R.M., Microbiology, 2nd Edition. Wm. C. Brown Publishers
2. Pelczar, M.J., Chan E.C.S., Krieg, N.R., Microbiology, 5th Edition. Tata McGraw Hill Publication Co. Ltd. New Delhi.
3. Powar and Daginawala, General Microbiology Vol-I. Himalaya Publishing House, Mumbai.
4. Tortora, Funke & Case. Microbiology-An Introduction, 8 Edition, Pearson Education, Delhi
5. Purohit, S.S., Microbiology-Fundamentals and Applications-6th Edition, Agrobios Publications, Delhi.

## MB-201 MB-201 BASICS OF BIOCHEMISTRY AND MICROBIAL CONTROL (PRACTICAL)

Practical Hours – 3hrs/day for 2 days/Week Total Credit – 3 Total 6 hours/Week

- 1) Qualitative analysis of Amino acids and Proteins
- 2) Qualitative analysis of Carbohydrates
- 3) Colorimetric estimation of Protein by Folin and Lowry's method
- 4) Titrimetric estimation of reducing Sugars by Cole's method
- 5) Colorimetric estimation of reducing sugar by DNSA method
- 6) Effect of Chemicals on growth of bacteria by disc method
- 7) Effect of Alcohols on growth of bacteria by Disc method
- 8) Effect of Heavy metal on growth of bacteria – oligo dynamic action
- 9) Effect of Antibiotics on growth of bacteria: Agar ditch method and Agar cup Method.
- 10) Assay of Alpha – Amylase by iodometric method
- 11) Study of effect of Temperature on Enzyme activity
- 12) Study of effect of pH on Enzyme activity

## REFERENCE BOOKS (SEMESTER 2 PRACTICAL)

1. Patel. R.J., Patel. K.R., Experimental Microbiology, Vol-I, Aditya Publications, Ahmedabad, India.
2. Patel. R.J., Patel. K.R., Experimental Microbiology, Vol-II, Aditya Publications, Ahmedabad, India.
3. Dubey. R.C., Maheshwari. D.K., Practical Microbiology, S.Chand & Company Ltd., New Delhi
4. Konika Sharma., manual of Microbiology – Tools & Techniques, Ane Books, Delhi.