

COURSE WISE BREAKUP

Fourth Year Seventh Semester

SPECILIZATION

BIOCHEMISTRY

THEORY

COURSE CODE	TITLE	CREDIT HOURS	MARKS
CHEM-431	PAPER-I: BIOCHEMISTRY	03	100
CHEM-432	PAPER-II: BIOCHEMISTRY	03	100
CHEM-433	PAPER-III: BIOCHEMISTRY	03	100

PRACTICALS

COURSE CODE	TITLE	CREDIT HOURS	MARKS
CHEM-431	PAPER-I: BIOCHEMISTRY	02	50
CHEM-432	PAPER-II: BIOCHEMISTRY	02	50
CHEM-433	PAPER-III: BIOCHEMISTRY	02	50

- **Total Credits of the Semester = 15 (theory 09 & practicles 06 credits)**
- **Maximum Marks = 450 (theory 300 & practicles 150 marks)**

4th Year; 7th Semester

PAPER-I

Title of the Course: **BIOCHEMISTRY**

Code: **CHEM-431**

Credit Hours: **03**

Marks: **100**

Course Contents:

Prerequisites: Course I and concept of basic human physiology

Objective of the Course: This course provides fundamental concepts biochemical and molecular aspects of endocrinology and chemistry of blood and other extracellular fluids. Emphasis is on relation of the above topics to medicine.

Course Contents:

Endocrinology

General Introduction, Chemical Nature of Hormones, Common Characteristics. Mode of action of hormones, Hormones receptors. Chemistry. Biosynthesis, Metabolism and biological functions of pituitary, Adrenal, Thyroid, parathyroid, pancreatic and gonadal hormones. Hormones of GIT, Renal and Pinal glands.

Blood and Other Body Fluids.

General composition of blood. Function of blood. Blood plasma, Plasma proteins; composition and functions, Composition, development and functions of red blood cells, white blood cells and platelets, Haemoglobin; chemistry, properties, synthesis, functions and derivatives, Degradation of haemoglobin, respiration and gas transport. Blood Coagulation and clotting of blood. Blood pressure. Blood groups Composition of Urine, Extracellular Fluids Like: cerebrospinal fluid, lymph, Sweat, Tears, Synovial and interstitial fluid.

RECOMMENDED BOOKS:

1. Lehninger, A. L, " Principles of Biochemistry", Worth Publisher, New York, (2001).
2. Voet, D. and Voet J. G., "Biochemistry", John Wiley & Sons, New York, (2000).
3. Murray, R. K., Mayes P. A., Granner, D. K. and Rodwell, V. W., Harper's Biochemistry", Appleton & Lange (2000).
4. Guyton, C and Hall J. C., Text Book of Medical Physiology, 9th., W. B. Saunders Company, (1996)

5. Orten, J. M. & Neuhasus, O. W., Human Biochemistry, 9th Ed., The C. V. Mosby Company, Saint Louis (1975).
6. Devlin, T. M. (Editor), The Text Book of Biochemistry with Clinical Correlation, Wiley-Liss, New York (1997).
7. Wilhelm R. Frisell, "Human Biochemistry", Macmillan Publishing Co., Inc. New York (1982).

4th Year; 7th Semester

PAPER-II

Title of the Course: **BIOCHEMISTRY**

Code: **CHEM-432**

Credit Hours: **03**

Marks: **100**

Course Contents:

Course Outlines Extraction, Fractionation and Purification of Macromolecules

Homogenization, Solubilization and Concentration including ultrasonication, lyophilization and ultracentrifugation, Purification based on differential solubility techniques, Ion-Exchange chromatography, Gel chromatography, Affinity chromatography, Paper & Thin layer chromatography and HPLC.

Electrophoresis

Paper and Gel electrophoresis. Two-dimensional electrophoresis. Capillary electrophoresis.

Electrofocusing

Preparative and Analytical electrofocusing.

Centrifugation

Principle. Preparative centrifugation. Application of density gradient and differential centrifugation. Ultracentrifugation. Sedimentation equilibrium and sedimentation velocity methods. Application of analytical centrifugation.

Tracer techniques

Detection and measurement of radioactivity. Application of radioisotopes in biological system.

U.V. and Visible Spectroscopy

Basic principles. Instrumentation and applications.

ELISA Techniques

RECOMMENDED BOOKS:

1. The tools of Biochemistry by Cooper
2. Principles and techniques of practical Biochemistry by William Edward and Arnold
3. Qualitative problems in Biochemistry by Dawas
4. A biologist's Physical chemistry by J.Gareth Morris
5. Protein purification, principle and practice by Robert.K.Scope.

4th Year; 7th Semester

PAPER-III

Title of the Course: **BIOCHEMISTRY**

Code: **CHEM-433**

Credit Hours: **03**

Marks: **100**

Course Contents:

Molecular Biology

DNA; the primary genetic material. Structure, Replication in prokaryotes and comparison with eukaryotes. DNA sequencing. Chemical synthesis of polynucleotides. DNA repair and recombination. Different types of RNA and their role in protein synthesis. Transcription and its regulation. Genetic code. Post transcriptional processing. Structure of transfer RNA. Protein synthesis inhibitors. Control of translation . Post translational modification. Plasmids, bacteriophage and cosmids. In vitro mutagenesis: Deletion, Insertion and Substitution. Recombinant DNA and genetic diseases.

RECOMMENDED BOOKS:

1. Watson, J.D., Baker, T.A., Bell, S.P., Gann, Molecular Biology of the Gene 2004, Pearson Education, Inc.
2. Watson, J.D. Tooze, J and Kurtz, D.T. Recombinant DNA Scientific American Books. Freeman
3. Lewin B. Gene VII. Oxford University Press
4. Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts, Peter Walter Molecular Biology of the Cell 5th Edition Taylor &Francis
5. T. A. Brown. Genomes 3rd Edition Taylor &Francis

4th Year; 7th Semester

PAPER-I

Title of the Practicals: **BIOCHEMISTRY**

Code: **CHEM-431**

Credit Hours: **02**

Marks: **50**

Laboratory work illustrating topics covered in the lecture of papers I.

4th Year; 7th Semester

PAPER-II

Title of the Practicals: **BIOCHEMISTRY**

Code: **CHEM-432**

Credit Hours: **02**

Marks: **50**

Laboratory work illustrating topics covered in the lecture of papers II.

4th Year; 7th Semester

PAPER-III

Title of the Practicals: **BIOCHEMISTRY**

Code: **CHEM-433**

Credit Hours: **02**

Marks: **50**

Laboratory work illustrating topics covered in the lecture of papers III.

RECOMMENDED BOOKS:

6. Watson, J.D., Baker, T.A., Bell, S.P., Gann, Molecular Biology of the Gene 2004, Pearson Education, Inc.
7. Watson, J.D. Tooze, J and Kurtz, D.T. Recombinant DNA Scientific American Books. Freeman
8. Lewin B. Gene VII. Oxford University Press
9. Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts, Peter Walter Molecular Biology of the Cell 5th Edition Taylor &Francis
10. T. A. Brown. Genomes 3rd Edition Taylor &Francis