

COURSE WISE BREAKUP

Second Year Fourth Semester

THEORY

COURSE CODE	TITLE	CREDIT HOURS	MARKS
ENG-202	ENGLISH-IV/UNIVERSITY OPTIONAL	03	100
GEN-202	GENERAL-VI	03	100
GEN-202	GENERAL-VII	03	100
CHEM-212	ANALYTICAL CHEMISTRY	02	75
CHEM-222	APPLIED CHEMISTRY	02	75
CHEM-232	BIOCHEMISTRY	02	75

PRACTICALS

COURSE CODE	TITLE	CREDIT HOURS	MARKS
CHEM-212	ANALYTICAL CHEMISTRY	01	25
CHEM-222	APPLIED CHEMISTRY	01	25
CHEM-232	BIOCHEMISTRY	01	25

- Total Credits of the Semester = 18 (theory 15 & practicles 03 credits)
- Maximum Marks = 600 (theory 525 & practicles 75 marks)

2nd Year; 4th Semester

Title of the Course: **ENGLISH-IV/UNIVERSITY OPTIONAL**

Code: **ENG-202**

Credit Hours: **03**

Marks: **100**

2nd Year; 4th Semester

Title of the Course: **GENERAL-VI**

Code: **GEN-202**

Credit Hours: **03**

Marks: **100**

Teaching and Learning:

Focusing on preparing yourself, your course and your students for a constructive learning. Creating an active, interactive and motivating learning environment for your students. Identifying student difficulties and encouraging students participation in seminars, workshop and declamation contests. Monitoring and evaluation of students learning through home assignments, tests, essays, reports, publications, presentations on course related work. Arranging study tours. Students feed back for the evaluation of teacher by students.

2nd Year; 4th Semester

Title of the Course: **GENERAL-VII**

Code: **GEN-202**

Credit Hours: **03**

Marks: **100**

Environmental Sciences:

Concept of ecology and ecosystem, conservation of ecosystem. Population growth, poverty and diseases. Depletion of natural resources and its effect on environment. Contamination of water, soil and air. Climate change: past, present and future. Acid rain, global warming and its effects on earth. Ozone depletion. Earth atmospheric system.

2nd Year; 4th Semester

Title of the Course: **ANALYTICAL CHEMISTRY**

Code: **CHEM-212**

Credit Hours: **02**

Marks: **75**

Course Goals

1. This course will introduce you to the vocabulary and concepts used in basic Analytical Chemistry.
2. You will learn the details of steps involved in the preparation and analysis of a sample, the chemical basis and various techniques of analysis.
3. You will also learn and use statistical methods to determine the precision and accuracy of experimental results.
4. Graded assignments, quizzes, class tests and a *final exam* will test your understanding of the material dealing with these goals.
5. To develop skills needed to solve analytical problems in a quantitative manner, particularly with the aid of the spreadsheet tools.
6. Teaching laboratory skills that will give students confidence in their ability to obtain high-quality analytical data.

Course Contents:

1. Introduction to Analytical Chemistry

Scope and applications of Analytical Chemistry, quantitative reactions, stoichiometric relationships, solution chemistry, expression of quantities and concentrations. Basic approach to equilibrium.

2. Sampling

Types of sampling techniques, sampling of gas, liquid and solid, treatment of samples to obtain homogeneous solutions.

3. Errors in Chemical Analyses and Minimization

Steps in analytical procedures, errors, precision, accuracy, types of errors, steps involved in minimization of errors.

4. Statistical Evaluation of Data

Ways of expressing accuracy, mean, median, mode, deviation, standard deviation, mean deviation, relative standard deviation. The confidence limit, confidence interval, rejection of the results, limit of detection and quantification.

2nd Year; 4th Semester

Title of the Practicals: **ANALYTICAL CHEMISTRY**

Code: **CHEM-212**

Credit Hours: **01**

Marks: **25**

RECOMMENDED BOOKS:

1. Analytical Chemistry by Gary D. Christian; 6th ed. 2004; John Wiley & Sons, Inc.
2. Douglas A. Skoog, Donald M. West, F. James Holler, Stanley R. Crouch, "Fundamentals of Analytical Chemistry" 8th ed. 2003; Saunders College Publishing, Philadelphia.
3. Instrumental Methods of Analysis by Hobert H. Willard D.L. Merrit & J.R.J.A. Dean, Frank A. Settle; 7th Sub edition 1988; Wadsworth Publishing Company.
4. Laboratory Manual of Analytical Chemistry by C. Reilly; Allyn and Bacon, London.
5. Quantitative Analysis by W. J. Blaedal and V. W. Medloche; Harper & Row, N.Y.
6. J.G. Dick, Analytical Chemistry, McGraw-Hill, Tokyo.

2nd Year; 4th Semester

Title of the Course: **APPLIED CHEMISTRY**

Code: **CHEM-222**

Credit Hours: **02**

Marks: **75**

Fundamentals of Chemical Industry

Basic principles and parameters for industrial plant location; Elementary treatment of general unit operations commonly used in industries such as size reduction; evaporation, filtration, distillation, crystallization and drying; Chemical unit processes like carbonation, sulfitation, defecation, nitration, etc. in chemical process industries.

Basic and Heavy Chemical Industries

Raw materials and chemicals; Flow sheet diagrams and commercial production of sulphuric acid, nitric acid, hydrochloric acid, oxalic acid, formic acid, caustic soda and washing soda; Applications of these chemicals in chemical industries.

Glass Industry

Raw materials and manufacture of glass; Chemistry involved in the production of glass; Types of glass; Glassy state phenomena and annealing of glass; Photochromic and photographic glasses; Production of safety glasses.

Ceramics Industry

Raw material used for ceramics; Chemistry involved in the production of ceramics articles and wares; Types and classification of ceramic products; Manufacture of ceramics products.

Cement Industry

Raw materials used for cement production; Chemistry involved in the production of cement; Manufacture of cement by wet and dry processes; Types of cement and composition of clinker. Chemical phenomena and chemistry involved in the hardening and setting of cement.

Water Treatment, Steam Production and Scale Removal

Sources of water; Hardness of water; Water treatment and conditioning for municipal and industrial purposes. Steam production and its utilization for power and energy generation; Boiler water treatment; Chemistry involved in the formation of scale; Prevention of scale formation.

2nd Year; 4th Semester

Title of the Practicals: **APPLIED CHEMISTRY**

Code: **CHEM-212**

Credit Hours: **01**

Marks: **25**

RECOMMENDED BOOKS:

1. Badger L.W. and T.J. Banchero. (1955) "Introduction to Chemical Engineering" Student ed. McGraw-Hill Book Company, New York.
2. Riegel, E.R. (1956)." Industrial Chemistry" 5th ed. Reinhold Publishing Corporation, New York.
3. R. N. Shreve, The chemical process industries, McGraw-Hill Book Company.
4. Vogel, I. A.,Text Book Quantitative Inorganic Analysis, 7rd Ed., Longman, Green and Co. Ltd. UK (1961) and (1978).
5. E D Mahin, Chemical analysis McGraw-Hill Book Company, New York.
6. G.H.Jenkins, Intoduction to Sugarcane Technology (1965).

7. Howard L. White, Introduction to Industrial Chemistry (1992).
8. P. F. Stanbury & A. Whitaker, Principles of fermentation Technology, (1987).
9. G. C. Bye., Portland Cement, (1983).
10. We Worrall, Clays, (1968).
11. Academy of Science USSR, The Structure of glass, (1953).
12. G. O. Jones, Glass, 2nd Ed., (1971).

2nd Year; 4th Semester

Title of the Course: **BIOCHEMISTRY**

Code: **CHEM-232**

Credit Hours: **02**

Marks: **75**

Prerequisites: Basic courses of Organic Chemistry and Biology

Objective of the Course: This course provides fundamental concepts in biochemistry, which focuses upon the major macromolecules and chemical properties of living systems. Primary topics include the structures, properties and functions of amino acids, proteins, carbohydrates, lipids and nucleic acids.

Course Contents:

Introduction to Biochemistry

Brief introduction, to the scope and history of Biochemistry. Molecular logic of the living organism. Cell structures and their functions. Origin and nature of biomolecules

Carbohydrates

Definition and classification, Chemistry, physical and chemical properties of various classes of carbohydrates. Biological functions of starch, glycogen, cellulose and cell wall polysaccharides, acid mucopolysaccharides and proteoglycans.

Lipids

Definition and classification of lipids. Chemistry and biological importance of fatty acids, waxes, glycerides, phospholipids, sphingolipids, glycolipids, sterols and prostaglandins.

Significance of lipids in biological membranes and transport mechanism

Proteins

Chemistry and Classification of Amino acids, Physical and chemical properties of amino acids. Biological significance of amino acids, peptides. Proteins; their classification, properties and

biological significance, Primary, secondary tertiary and *quaternary* structure of proteins.
Denaturation of proteins.

Nucleic Acids

Chemical composition of nucleic acids. Structure and biological significance of nucleic acids.
Chemical synthesis of oligonucleotides. Nucleic acids hydrolysis. Isolation and separation of
Nucleic acids. Introduction to recombinant DNA technology.

2nd Year; 4th Semester

Title of the Practicals: **BIOCHEMISTRY**

Code: **CHEM-212**

Credit Hours: **01**

Marks: **25**

RECOMMENDED BOOKS:

1. Lehninger, A. L, "Principles of Biochemistry", Worth Publisher, New York, (2001).
2. Voet, D. and Voigt 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. Robert, Harper's Biochemistry", 25th Ed, (2000). 5. West, Text Book of Biochemistry", 4th Ed., (2000).
5. Zubay, G., Biochemistry, 4th Ed., Macmillan Publishing Co. (1999).
6. Bhagavan. N. V., Biochemistry, 2nd Ed., J.B. Lippincott Company (1978)