Dr. B.R. AMBEDKAR UNIVERSITY, SRIKAKULAM
(CBCS Proposed Syllabus)
Subject: Analytical Chemistry
w.e.f. 2020-21
II B.Sc ANALYTICAL CHEMISTRY
SEMESTER IV
Course – V ANALYTICAL CHEMISTRY-5 (4 H/w)
ANALYTICALBIOCHEMISTRY AND ENVIRONMENTAL CHEMISTRY

Objectives: The Objective of the course is to learn about proteins, enzymes, nucleic acids and lipids, using suitable examples

Learning Outcomes: By the end of the course, the students will be able to:
Learn how the analysis of oils, fats, fuels , metals, drugs and water.

UNIT – I **1 2hrs**

Oils and Fats. Classification – properties – manufacture of soya bean oil by solvent extraction – refining of vegetable oils – hydrogenation of oils – analysis of oils- acid value – saponification value – iodine value – aniline point.

UNIT – II **12 hrs**

Fuels and analysis: classification of fuels – properties of fuels proximate analysis – calorific value. Solid Fuels: proximate analysis of coal – ultimate analysis of coal.
Gaseous Fuels: natural gas – synthetic gas – water gas – carbureted water gas – oil gas – LPG – Bio gas – analysis of gases. Liquid Fuels: occurance – mining – refineries in India – flash point – fire point – octane number – cetane number - cracking

Unit-III: **12 hrs**

Metallurgy: classification of ores- general principles of metallurgy – purification of metallurgy. Analysis of Iron, limestone, pyrosulite and copper

Unit-IV: **12 hrs**

Standardization and Quality Control of different Dosage Forms: Brief introduction to different dosage forms with the IP requirements, analytical methods for the following: Tablets (aspirin), additives used in tablet manufacture, capsules (Rifampicin), powders (Sodium benzoate), solutions (saline, NaCl) suspensions (barium sulphate–limit test for impurity), mouthwashes (Ointments (salicylic acid)

UNIT - V **12 hrs**

Concept and scope of environmental chemistry – Classification of water pollutants – Characterization – Dissolved Oxygen – BOD – COD - Waste water treatment (General).

Disposal of radioactive wastes. Pollution due to some typical industries like Textile, Pulp and Paper, Electroplating, Dairy, Cane sugar

Laboratory

Course-V Analysis of Bio Products 30 hrs (2 h / w)

Identification and estimation of the following:

1. Estimation of ion in plain carbon steel.
2. Estimation of calcium present in Limestone.
3. Determination of the iodine number of oil.
4. Determination of the saponification number of oil.
5. determination of the acid value of an oil.
6. estimation of MnO_2 in Pyrosulate.

Suggested Readings:

1. T. G. Cooper: Tool of Biochemistry.
2. Keith Wilson and John Walker: Practical Biochemistry.
3. Alan H Gowenlock: Varley's Practical Clinical Biochemistry.
4. Thomas M. Devlin: Textbook of Biochemistry.
5. JeremyM. Berg, John L Tymoczko, Lubert Stryer: Biochemistry.
6. G. P. Talwar and M Srivastava: Textbook of Biochemistryand
7. Human Biology.
8. A.L.Lehninger: Biochemistry.
9. O. Mikes, R.A. Chalmers: Laboratory Handbook of Chromatographic Methods.
10. Environmental chemistry by A.K.De
11. A text book of engineering chemistry by S.S.Dara
12. A text book of Industrial chemistry by B.K.Sharma

Teaching Learning Process: Lectures using teaching aid (chalk/power point/videos), Group discussion,

• Presentations, Advise to students to prepare a report. Assessment Methods:

a. Presentation by individual student
b. Class test
c. Laboratory test
d. Written assignments
e. End semester University theory and practical examinations

MODEL PAPER FIRST YEAR
B.Sc., DEGREE EXAMINATION
SEMESTER-IV
ANALYTICAL CHEMISTRY
Course-V; ANALYTICALBIOCHEMISTRY AND ENVIRONMENTAL CHEMISTRY

Time: 3 hours **Maximum Marks: 75**

PART- A **5 X 5 = 25Marks**
Answer any FIVE of the following questions.
Each carries FIVE marks

1. Write a short note on properties of oils?
2. Write about refining of oils?
3. Write about octane number and cetane number?
4. Explain the analysis of Ion in steel sample?
5. Write a short note on the different dosage forms with the IP requirements
6. Write a short note on the additives used in tablet manufacture
7. Explain the Classification of water pollutants
8. Explain in brief about the Waste water treatment

PART- B **5 X 10 = 50 Marks**
Answer ALL the questions.
Each carries TEN marks

9 (a). Explain the proximate analysis of coal? (or)
(b). Explain the following 1. Water gas 2. Producer gas

10 (a). Explain the analysis of oils. (or)
(b). Write about the manufacture of soysbean oil by solvent extraction?

11 (a). Write about the general principles of metallurgy? (or)
(b). write the estimation of the percentage of calcium present in limestone?

12 (a). Explain IP requirements and analytical methods for the aspirin and Rifampicin (or)
(b). Explain the standardization and Quality Control and dosage Forms of mouthwashes and ointments

13 (a). Explain in detail about the disposal of radioactive wastes (or)
(b). Describe the pollution due to the industries of Pulp, Paper and Textile

***

Dr. B.R. AMBEDKAR UNIVERSITY, SRIKAKULAM

(CBCS Proposed Syllabus)

Subject: Analytical Chemistry

w.e.f. 2020-21

II B.Sc ANALYTICAL CHEMISTRY

SEMESTER – IV

Course IV - ANALYTICAL CHEMISTRY-4 60hrs (4h/w)

INSTRUMENTAL METHODS – II

Objective: Objective of this course is to learn the separation techniques and its application Course

Learning Outcomes: At the end of the course, student should be able to understand: Various types of separation techniques and their applications Electrophoretic techniques and Centrifugation techniques

UNIT – I **12hrs**

Gas Chromatography

Gas- liquid chromatography: Apparatus and materials, preparation and application of samples, separation conditions, detectors, applications.

UNIT –II **12hrs**

CONDUCTO METER: introduction – some fundamental relation ships – equivalent and molar conductance – AC conduction – measurement of conductivity – and applications of conductometry titrations

UNIT –III **12hrs**

Potentiometric measurements: introduction – instrumentation of potentiometric titrations – apparatus – procedures – applications of potentiometric titrations.

UNIT – IV **12hrs**

Spectroscopy: visible spectroscopy and colourimetry: electromagnetic spectrum – absorption methods and terms associated with absorption measurements – loss of absorption – instrumentation of spectrophotometer – applications of absorption spectroscopy –qualitative and quantitate, colourmetry determination of ammonia, phosphate

UNIT – V **12hrs**

Centrifugation Methods: Introduction, sedimentation and relative centrifugal force, different types of rotors, density gradients, types of centrifugation techniques.

LABORATORY COURSE -IV

Practical-IV Separation Techniques 30 hrs (2 h / w)

(At the end of Semester-IV)

1. Determination of the strength of the given HCl solution by titrating it against NaOH solution conductometrically.
2. Determination of residual chlorine in city water supply using colorimetry.
3. Determination of adsorption isotherm of acetic acid on activated charcoal. Determination of the adsorption constant (k)
4. determination of Manganese by spectrophotometry.

Suggested Readings:

1. R.V. Dilts: Analytical Chemistry- Methods of Separation.
2. O. Mikes, R.A. Chalmers: Laboratory Handbook of Chromatographic Methods.
3. F.W. Fifield and D.Kealy: Principles and practice of analytical chemistry.
4. Vogel's textbook of quantitative chemical analysis, 6 th edition.
5. Vogel's textbook of quantitative chemical analysis,
7 th edition. 6. Keith Wilson and John Walker: Practical Biochemistry.
7. Chromatography: Basic Principles, Sample Preparations and Related Methods by Elsa Lundanes, Leon Reubsaet, Tyge Greibrokk, John Wiley and Sons, 2013
8. Introduction to Modern Liquid Chromatography by Lloyd R. Snyder, Joseph J.
9. Kirkland and John W. Dolan, Wiley
10. Practical HPLC Method Development by Lloyd R. Snyder, Wiley-Interscience
11. Principles & Practices of Chromatography by R. P. W. Scott, Library for Science
12. Fundamentals of Analytical Chemistry, VIII Edn., D. A. Skoog, D. M. West, F.J.
13. Holler and S.R.Crouch, Thomson Brooks/Cole Publishers, 2004.
14. Principles of Instrumental Analysis by D.A. Skoog, F.J. Holler and T.A. Nieman, 5 th
15. Edition (1998), Harcourt Brace & Company, Florida.
16. Instrumental Methods of Chemical Analysis, B. K. Sharma, Goel Publishing House, Meerut.
17. Instrumental Methods of Chemical Analysis, Chatwal and Anand, Himalaya Publishing
18. chemical analysis by S. Chand and company

Teaching Learning Process: Lectures using teaching aid (chalk/power point/videos), Group discussion,

- Presentations, Advise to students to prepare a report.

Assessment Methods:

a. Presentation by individual student

b. Class test c. Laboratory test

d. Written assignments

e. End semester University theory and practical examinations

MODEL PAPER FIRST YEAR
B.Sc., DEGREE EXAMINATION
SEMESTER-IV
ANALYTICAL CHEMISTRY
Course-IV; SEPARATION METHODS – II

Time: 3 hours **Maximum Marks: 75**

PART- A **5 X 5 = 25 Marks**
Answer any FIVE of the following questions.
Each carries FIVE marks

1. write about AC conduction?
2 write about retention time and retention volume?
3. explain about Beer's Lambert's law?
4. write the instrumentation of potentiometry?
5. write about the applications of conductrometric titrations?
6. write briefly on working technique of gas chromatography?
7. write terms associated with absorption measurements?
8. Explain the density gradients of centrifugation

PART- B **5 X 10 = 50 Marks**
Answer ALL the questions.
Each carries TEN marks

9 (a). Explain the instrumentation of Gas chromatography? (or)
(b). Explain the gas – liquid chromatography and its applications

10 (a). Write about conductometric titrations? (or)
(b). Discuss the instrumentation of conductometry?

11 (a). Write the principle and instrumentation of potentiometry?(or) (b). Explain the apparatus and procedure of potentiometric titrations?

12 (a). Write about the instrumentation of Spectrometer? (or) (b). Write about colourmetric measurement of Ammonia and Phosphate?

13 (a). Explain the principle and types of centrifugation methods (or)
(b).Write an essay on the sedimentation and relative centrifugal force methods

***