Course Out comes

PRR&VS GOVT. DEGREE COLLEGE, VIDVALURU

DEPARTMENT OF CHEMISTRY

B.Sc., CHEMISTRY PROGRAM

- To enable the students to understand basic facts and concepts in Chemistry while retaining the exciting aspects of Chemistry so as to develop the interest in the study of chemistry as a discipline.
- To acquire the knowledge of terms, facts, concepts, processes techniques and principles of the subject.
- To develop the ability to apply the principles of Chemistry.
- To be inquisitive towards advanced chemistry and developments therein.
- To appreciate the achievements in Chemistry and to know the role of Chemistry in everyday life.
- To develop problem-solving skills.
- To be familiarized with the emerging areas of Chemistry and their applications in various spheres of Chemical Sciences and to apprise the students of its relevance in future studies.
- To develop skills in the proper handling of apparatus and chemicals.
- To be exposed to the different processes used in industries and their applications.

PRR&VS GOVT. DEGREE COLLEGE, VIDVALURU

DEPARTMENT OF CHEMISTRY

COURSE OUT COMES OF IB.SC CHEMISTRY

CHEMISTRY Course-I: INORGANIC & PHYSICAL CHEMISTRY

COURSE CODE: CHE101 SEMESTER-I

Course outcomes:

At the end of the course, the student will be able to;

During the bridge course conducted in the beginning, the students of I st B.Sc., become familiar with structure of atom, periodic table, periodic trends , IA &IIA group alkali and alkaline earth metals and fundamentals of terminology used in Chemistry subject.

By the end of I ST semester the students are able to know the importance of elements its applications in various fields present in the periodic table especially Groups13, 14, 15, 16 &17.

1. Understand the basic concepts of p-block elements
2. Explain the difference between solid, liquid and gas esinterms of intermolecular interactions.
3. Apply the concepts of gas equations, pH and electrolytes while studying other chemistry courses while studying other chemistry courses.

The syllabus s very useful for appearing to the Chemistry related competitive examinations like P.G entrance, CSIR-NET etc.

LABORATORY COURSE-I

Practical-I Simple Salt Analysis (At the end of Semester-I)

COURSE CODE: CHE101 (PI) *SEMESTER-I*

To impart skill to students in the systematic qualitative analysis of simple salt containing one cation and one anion..

COURSE OUT COMES OF I B.SC CHEMISTRY

Paper-II

SEMESTER – II

Course II – (Organic & General Chemistry)

COURSE CODE: CHE102 *SEMESTER-II*

Course outcomes:

At the end of the course, the student will be able to;

1. Understand and explain the differential behavior of organic compounds based on fundamental concepts learnt.
2. Formulate the mechanism of organic reactions by recalling and correlating the fundamental properties of the reactants involved.
3. Learn and identify many organic reaction mechanisms including Free Radical Substitution, Electrophilic Addition and Electrophilic Aromatic Substitution.
4. Correlate and describe the stereochemical properties of organic compounds and reactions.

5.Learn about in surface chemistry colloids types, sols and its preparation methods, Hardy-Schulze law, protective colloids, Gold number, Emulsions, Gels preparation, its properties with examples, Adsorption phenomenon.

6.Learn in chemical bonding how valence bond explains the type molecules and complexes are formed, Molecular orbital theory explains about molecular orbital formations, and homo and hetero binuclear molecules formation according to MOT with examples, N_2, O2, HCl etc .and also the magnetic property of molecules known like why oxygen molecule is paramagnetic and the number of bonds formed between molecules basing on bond order.

7. Understand the importance of stereochemistry and its use pharmaceutically etc of carbon compounds, isomerism conformations, configurations, enantiomers, diastereomers, chiral and acharial carbon atoms.

Overall learning and understanding the above course is useful in their higher studies.

LABORATORY COURSE-II

Practical-II Volumetric Analysis

(At the end of Semester-II)

COURSE CODE: CHE102 (PII) *SEMESTER-II*

Course outcomes:

At the end of the course, the student will be able to;

1. Use glassware, equipment and chemicals and follow experimental procedures in the laboratory
2. Understand and explain the volumetric analysis based on fundamental concepts learnt in ionic

equilibria

3. Learn and identify the concepts of a standard solutions, primary and secondary standards
4. Facilitate the learner to make solutions of various molar concentrations. This may include: The concept of the mole; Converting moles to grams; Converting grams to moles; Defining concentration; Dilution of Solutions; Making different molar concentrations.

COURSE OUT COMES OF II B.SC CHEMISTRY

SEMESTER - III

Paper III Course III (ORGANIC CHEMISTRY & SPECTROSCOPY)

COURSE CODE: CHE103 *SEMESTER-III*

Course outcomes:

By the completion of IIIrd semester the students are well versed with the knowledge of Organic chemistry and Spectroscopy part which is in their curriculum.

At the end of the course, the student will be able to;

1) Understand preparation, properties and reactions of halo alkanes, halo arenes and oxygen containing functional groups.

2. Use the synthetic chemistry learnt in this course to do functional group transformations.

3. To propose plausible mechanisms for any relevant reaction

4.The chemistry of halogen compounds nomenclature, classification, nucleophilic substitution reactions, the chemistry of hydroxyl compounds, nomenclature, preparation, properties, identification of alcohols, special reactions of phenols are learned.

5. Able to learn Carbonyl compounds of aliphatic and aromatic, preparation and their properties.

6. Able to learn about carboxylic acids and their derivatives, methods of preparation, physical and chemical properties.

7. Spectroscopy which is very important tool in Analytical chemistry and applications of Beer-Lambert' law is very useful to determine the unknown samples.

8. Knowing Electronic spectroscopy, the energy levels of molecular orbital's (sigma,pi,pi), selection rules for electronic spectra, types of electronic transitions in molecules effect of conjugation, concept of chromophore and auxochrome.*

9. To determine the structure is very important for organic chemist. Various spectroscopic methods are available like NMR, IR, UV absorption spectroscopes are few of them. The students are given a very preliminary idea on in this course.

LABORATORY COURSE -III

Practical-III Practical Course-III (Organic preparations and IR Spectral Analysis)

(At the end of Semester-III)

COURSE CODE: CHE103 (PIII) *SEMESTER-III*

By the end of III Semester Laboratory Course the students are able to develop skills for quantitative estimation using the volumetric Analysis.

Course outcomes:

On the completion of the course, the student will be able to do the following:.

1. How to use glassware, equipment and chemicals and follow experimental procedures in the laboratory
2. How to calculate limiting reagent, theoretical yield, and percent yield
3. How to engage in safe laboratory practices by handling laboratory glassware, equipment, and chemical reagents appropriately
4. How to dispose of chemicals in a safe and responsible manner
5. How to perform common laboratory techniques including reflux, distillation, recrystallization, vacuum filtration.
6. How to create and carry out work up and separation procedures
7. How to critically evaluate data collected to determine the identity, purity, and percent yield of products and to summarize findings in writing in a clear and concise manner

COURSE OUT COMES OF II B.SC CHEMISTRY

Paper IV ((INORGANIC, ORGANIC AND PHYSICAL CHEMISTRY)

COURSE CODE: CHE104 *SEMESTER-IV*

Course outcomes:

At the end of the course, the student will be able to;

1. To learn about the laws of absorption of light energy by molecules and the subsequent photo chemical reactions.
2. Tounderstandtheconceptofquantumefficiencyandmechanismsofphotochemicalreaction s.

COURSE OUTCOME OF

Practical Course-IV Organic Qualitative analysis

(At the end of Semester- IV)

COURSE CODE: CHE104 (PIV) *SEMESTER-IV*

Course outcomes:

At the end of the course, the student will be able to;

1. Use glassware, equipment and chemicals and follow experimental procedures in the laboratory
2. Determine melting and boiling points of organic compounds
3. Understand the application of concepts of different organic reactions studied in theory part of organic chemistry

COURSE OUT COMES OF III B.SC CHEMISTRY

SEMESTER - V

CourseV (INORGANIC &PHYSICAL CHEMISTRY)

COURSE CODE: CHE105 *SEMESTER-V*

Students are able to learn and understand

Course outcomes:

At the end of the course, the student will be able to;

1. Understand concepts of boundary conditions and quantization, probability distribution, most probable values, uncertainty and expectation values
2. Application of quantization to spectroscopy
3. Various types ofspectra and the irusein structured etermination.
4. *About Coordination chemistry-IUPAC nomenclature, theories of Werner's, Sedgwick's, VBT,CFT of coordination Numbers 4 & 6 complexes, Isomerism –structural and stereoisomerism, spectral and magnetic properties of metal complexes, stability of metal complexes,.*

COURSE OUTCOME OF

Practical-Course –V Conductometric and Potentiometric Titrimetry

COURSE CODE: CHE105 (PV) *SEMESTER-V*

Course outcomes:

At the end of the course, the student will be able to;

1. Use glassware, equipment and chemicals and follow experimental procedures in the laboratory
2. Apply conceptsof electrochemistry in experiments
3. Be familiar with electroanalytical methods and techniques in analytical chemistry which study an analyte by measuring the potential (volts) and/or current (amperes) in an electrochemical cell containing the analyte

COURSE OUT COMES OF III B.SC CHEMISTRY
Paper VI (INORGANIC, ORGANIC & PHYSICAL CHEMISTRY)

COURSE CODE: CHE106 *SEMESTER-V*

Students are able to learn and understand by the end of Vth semester,

1. About reactivity of metal complexes, labile and inert complexes, and SN1 and SN^2 substitution reactions of square planar complexes – Tran's effect and applications of Trans effect.
About the biological significance of Na, K, Mg, Ca, Fe, Co, Ni, Cu, Zn and Cr Structures and functions hemoglobin, myoglobin and chlorophyll.

2. Chemical kinetics-derivation of I , IInd, IIIrd order reactions and examples. Derivation for time half change, Methods to determine the order of reactions, effect of temperature on rate of reaction, Arrhenius equation, concept of activation energy.

3. Learn photochemistry- laws of photochemistry, quantum yield –photochemical reaction mechanism hydrogen- chlorine, hydrogen-bromine reaction, Description of fluorescence, phosphorescence, photosensitized reactions.

4. Learn about heterocyclic compo Write down the definition and classification of carbohydrates and amino acids and

5. Discuss the structure and reactivates of glucose, fructose and □□aminoacids.unds of Furan, thiophene and pyrrole their aromaticity, preparations, electophilic substitution reactions, pyridine its structure, basicity, reactivity towards nucleophilic substitution.

6. Carbohydrates are energy giving substances in living organisms, so it is very important to know the structure of Glucose, fructose and interconversion of monosaccharide's are thoroughly understood by the students.

7. Amino acids and proteins are also very important in living organisms, classification of amino acids, method of synthesis, physical and chemical properties of amino acids, Structure and nomenclature of peptides and proteins are learned.

COURSE OUTCOME OF
Practical paper -VI Physical chemistry (At the end of Semester-V)

COURSE CODE: CHE106 (PVI) *SEMESTER-V*

To develop skills in doing experiments in kinetics, partition coefficient, surface tension, and viscosity of liquid.

The students will develop skill in adsorption of acetic acid on animal charcoal, verification of Freundlisch isotherm.

.COURSE OUT COMES OF III B.SC CHEMISTRY

Elective Paper VII B (ENVIRONMENTAL CHEMISTRY)

COURSE CODE: CHE107 SEMESTER-VI

By the completion of VI semester the students get broad awareness regarding the environment, segments of environment, natural resources, terms involved in environmental pollution, hydrological cycle etc.

What are the different types of pollutions like air, water, chemical toxicology? Pollutants causing environmental pollution, Green house effect, photochemical smog, acid rains, Depletion of ozone, Bhopal gas tragedy.

In water pollution the terms Dissolved oxygen, BOD, COD, suspended solids, total dissolved solids, hardness of water , removal of hardness of water, eutrification, principle of waste treatment,.

Effect of toxic chemicals like cyanide, pesticides, toxicity of heavy metals Pb, Hg, As & Cd.

Ecosystem and biodiversity: concepts, structure , abiotic, biotic, energy flow, food chains, food webs, tropic levels, cycles of carbon, nitrogen & phosphorous.

Definition of biodiversity, levels-types of biodiversity, biogeographically cycles of India, biodiversity at national, global and regional.

COURSE OUTCOME OF

Practical paper – Elective VII B

(At the end of Semester-VI)

COURSE CODE: CHE107 (PVII B) SEMESTER-VI

To impart the students a thorough knowledge of quantitative analysis of carbonates and bicarbonates in water volumetrically, complexometric titrations for the determination of total hardness of water.

COURSE OUT COMES OF III B.SC CHEMISTRY

SEMESTER - VI

Cluster Elective Paper VIII B-I (FUEL CHEMISTRY &BATTERIES)

COURSE CODE: CHE108 SEMESTER-VI

Students are able to learn and understand by the end of VI Semester

About Review of energy sources(Renewable and non-renewable)- classification of fuels and their calorific value, uses of coal(fuel and non fuel) in various industries, its composition, carbonization of coal, coal gas, producer gas, water gas composition and uses, fractionation of coal tar, uses of coal tar based chemicals ,requisites of a good metallurgical coke.

Learn Petroleum and petrol chemical industry-composition of crude petroleum, refining and different types of petroleum products and their applications.

Learn about Fractional distillation (principle and process), cracking (thermal and catalytic cracking).reforming petroleum and non petroleum fuels (LPG, CNG, LNG, biogas), fuels derived from biomass, fuel from waste, synthetic fuels (gaseous and liquids).

Learn about Lubricants- Classification of lubricants, lubricating oils (conducting and non conducting) solid and semi solid lubricants, synthetic lubricants, properties of lubricants (Viscosity index, cloud point, pore point) and their determination.

Learn about Batteries-Primary and secondary batteries, battery components and their role, characteristics of Battery .working of following batteries: pb acid, li-Battery, solid state electrolyte battery. Fuel cells, solar cell and polymer cell.

Overall learning and understanding the above course is useful in their higher studie

COURSE OUTCOME OF
Practical paper – Cluster Elective VIII B -I
(At the end of Semester-VI)

COURSE CODE: CHE108 (PVIII B-I) *SEMESTER-VI*

Developing skills in the Synthesis of Aspirin, Synthesis of paracetmal, Preparation of Acetanilide, Preparation of Barbuturic acid.

COURSE OUT COMES OF III B.Sc., CHEMISTRY
Cluster Elective Paper VIII B-2 (INORGANIC MATERIALS OF INDUSTRIAL IMPORTANCE)

COURSE CODE: CHE109 *SEMESTER-VI*

Students are able to learn and understand

About Recapitulation of S and p-Block Elements-Periodicity in s and P- block elements with respect to electronic configuration, atomic and ionic size, ionization enthalpy, electron negativity (Pauling, Milliken, and Alfred-Rochow scales).Allotropy in C, S, and p. oxidation states with reference to elements inert pair effect, diagonal relationship and anomalous behavior of first member of each group.

Learn about Silicate Industries-Glass: Glassy state and its properties, classification (silicate and non-silicate glasses). Manufacture and processing of glass, composition and properties of the following types of glasses: soda lime glass, lead glass, armored glass, safety glass, borosilicate glass, fluoro silicate, colored glass, photosensitive glass,

Learn about cements: Classification of cement, ingredients and their role, Manufacture of cement and the setting process, quick setting cements.

Learn about Fertilizers: Different types of fertilizers, Manufacture of the following fertilizers: Urea, ammonium nitrate, calcium ammonium nitrate, ammonium phosphates, poly phosphate, superphosphate, compound and mixed fertilizers, potassium chloride ,potassium sulphate.

Learn about Surface Coatings: Objectives of coatings surfaces, preliminary treatment of surface, classification of surface coatings, paints and pigments-formulation, composition and related properties. Oil paint, vehicle ,modified oils, pigments, toners and lakes pigments, Fillers, Thinners, Enamels ,emulsifying agents, Special paints(Heat retardant, Fire retardant, Eco-friendly paint plastic paint),Dyes.

Learn about Alloys: Classification of alloys, ferrous and non- ferrous alloys, and specific properties of elements in alloys. Manufacture of steel and surface treatment. Composition and properties of different types of steels.

Overall learning and understanding the above course is useful in their higher studies.

COURSE OUTCOME OF

Practical paper – Cluster Elective VIII B -2(At the end of Semester-VI)

COURSE CODE: CHE109 (P VIII B-2) *SEMESTER-VI*

Impart skill in Green Procedure for organic quantitative analysis detection of nitrogen, sulphur and halogens, Acetylating of primary amine by green method preparation of acetanilide, Nitration of phenols, Synthesis of Adipic acid by green oxidation, Green Procedure for Diels alder reaction b/w furan and maleic anhydride.

COURSE OUT COMES OF III B.SC CHEMISTRY

Cluster Elective Paper VIII B-3 (ANALYSIS OF APPLIED INDUSTRIAL PRODUCTS)

COURSE CODE: CHE110 *SEMESTER-VI*

Students are able to learn and understand

About Analysis of Soaps- Moisture and volatile matter, cobined alkali, total fatty matter, free alkali, total fatty acid, sodium silicate and chlorides.

Learn about analysis of oils- Saponification value, iodine value, acid value, ester value, bromine value, acetyl value. Analysis of industrial solvents like benzene, acetone, methanol and acetic acid, Determination of methoxyl and N-methyl groups.

Learn about Analysis of fertilizers-Urea, NPK fertilizer, super phosphate, Analysis of DDT, BHC, endrin ,endosulfone ,malathion ,parathion, Analysis of starch,sugars,cellulose and paper.

Learn about Gas Analysis- carbon dioxide, carbon monoxide, oxygen, hydrogen, saturated hydrocarbon, unsaturated hydrocarbons, nitrogen, octane number, cetane number. Analysis of Fuel gases like: water gas, producer gas, kerosene gas.

Learn about Analysis of cement: Loss on ignition, insoluble residue, total silica, sesqui oxides, lime, magnesia, ferric oxide, sulphuric anhydride.

Overall learning and understanding the above course is useful in their higher studies.

COURSE OUTCOME OF
Practical paper – Cluster Elective VIII B -3
(At the end of Semester-VI)

COURSE CODE: CHE110 (PVIII B-3) *SEMESTER-VI*

Given Training to the Cluster Students in Preparing Projects searching through internet on :-

1. A project Report on Insecticides and Pesticides in Fruits and Vegetables
2. A project Report on Preparation of Soy Bean Milk & Its Comparison with Natural Milk

B.Sc - Mathematics, Physics, Chemistry (M.P.C) Conventional
Programme Specific Outcomes

PSO 1: Understand the theoretical concepts of physical and chemical properties of materials and the role of mathematics in dealing with them in a quantitative way.

PSO 2: Analyse the concepts of mathematics, physics and chemistry and understand the relation among them like physical chemistry, mathematical modelling of physics and chemistry problems. Skills needed to handle instruments and adopt lab procedures to study physical chemical properties of materials.

PSO 3: Mathematical, numerical techniques required to model them.

PSO 4: Ability to interlink the skills and knowledge in mathematics, physics and chemistry and develop an aptitude to address the problems in biophysics, stock market analysis.

B.Sc - Botany, Zoology, Chemistry (B.Z.C) Conventional
Programme Specific Outcomes

PSO 1: To understand principles of origin of life and its evolutionary trends, Microbial diversity, chemical theory related to origin of life

PSO 2: To analysis the taxonomic range of various life forms as per their external characters and internal chemical constitutions (chemo taxonomy)

PSO 3: The knowledge About of ecological and phyto geographical studies related in environmental biodiversity with biotic and abiotic factors

PSO 4: Skills to study the principles of tissue culture techniques in biology leads to various diversity of life forms (hybrids) by using chemically synthesised growth hormones.

PSO 5: Ability to design the evolution of drugs form the biological sources and its applications without any side effects in nature.