CHEMISTRY – TWO LEVEL PAPERS

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14CH2001 BASIC INORGANIC CHEMISTRY

Credits: 3:0:0

Objective:
- To explain the importance of atomic structure and chemical bonding.
- To get thorough knowledge about various kinds of bonding in inorganic chemistry
- To expose to theory of acids and bases.

Outcome:
- Students will have the knowledge of atomic structure
- The students will know the basis of various types of bonding.
- The students will have a complete understanding of acid base theory

Course Description:
**Reference Books:**


14CH2002  TRANSITION METAL AND COORDINATION CHEMISTRY

**Credits:** 3:0:0

**Objective:**
- To explain the various theories of coordination chemistry
- To explain the nomenclature and isomerism in coordination compounds
- To get thorough knowledge about transition metal inorganic chemistry

**Outcome:**
- The students will know the properties of transition metal compounds
- Students will have the complete understanding of formation of coordination complexes
- The students will know the importance of crystal field theory

**Course Description:**


**Reference Books:**

Credits: 3:0:0

Objective:
- To explain the importance and properties of F-block elements.
- To explain the fundamentals of organometallic and bioinorganic chemistry
- To expose to inorganic copolymer chemistry

Outcome:
- Students will have the thorough knowledge of chemistry of f-block elements
- The students will know the importance of organometallic chemistry and bioinorganic chemistry.
- The students will know the applications of important inorganic polymers

Course Description:


Reference Books:


14CH2004 QUALITATIVE ANALYSIS AND INORGANIC PREPARATIONS LAB

Credits: 0:0:2

Objective:
- To provide the students an appreciation for the synthesis of Inorganic Complexes.
- To provide the students a competence in the laboratory skills required for accurate and precise chemical analysis.
- The students will know the theoretical basis of qualitative inorganic analysis containing common and less common ions.

Outcome:
- The student will gain the laboratory skills to synthesize the inorganic complexes
- will be confident in analyzing the mixtures containing common and less common ions using semimicro analysis
- Their separation skills will be improved

12 approved experiments will be notified at the beginning of the semester

14CH2005 TITRIMETRIC ANALYSIS AND GRAVIMETRIC ANALYSIS LAB

Credits: 0:0:2

Objective:
- To enrich the knowledge of estimation through titrimetric
- To gain some insights towards gravimetric skills
- To improve the Quantitative analytical skills

Outcome:
- Students acquire the knowledge of acidimetry and permanganometry,
- They understand the importance of iodometry, complexometry and dichrometry
- They can estimate any compound by gravimetry.

12 approved experiments will be notified at the beginning of the semester

14CH2006 BASIC ORGANIC CHEMISTRY

Credits: 3:0:0

Objective:
- The student will get rudimentary ideas on chemical structure
- Versatile knowledge about the formula of organic Molecules.
The student will have an idea about stereoisomerism and conformation in chemical structure and properties of molecules.

Outcome:
- The students will get the understanding on the structural basics of organic compounds
- They will understand the nomenclature of Organic compounds
- To Understand the stereoisomerism and conformation of organic molecules

Course Description:

Reference Books:

14CH2007 ALIPHATIC AND AROMATIC CHEMISTRY

Credits: 3:0:0

Objective:
- The student will be exposed to ideas about Aliphatic and aromatic compounds, their preparation and chemical properties.
- The student will learn about some common organic reactions
- To have an idea about the molecular rearrangements.

Outcome:
- The students will get knowledge on the reactions of carbonyl and nitrogen containing compounds
- They gain the knowledge about the molecular rearrangements
- They gain insights about features of commonly used name reactions
Course Description:

Aliphatic carbonyl compounds – Aliphatic nitrogen containing compounds – Aromatic aldehydes and ketones – Aromatic carboxylic acids – mono and dicarboxylic acids - Aromatic nitrogen containing compounds – Azines - Arenediazonium salts – Aldol, Perkin, Dieckman condensations – Reimer-Tiemann, Grignard reactions – Gattermann reaction, Friedel-Crafts reaction, Wittig reaction, Clemmensen reduction, Baeyer-Villiger reaction, Fries reaction, Stevens, Benzil-benzilic acid rearrangement, Curtius rearrangement, Hoffmann rearrangements

Reference Books:


14CH2008 BASIC REACTION MECHANISM

Credits: 3:0:0

Objective:

- Chemical reactions, which are mostly used to synthesize compounds of various types, and their mechanism, are discussed.
- Distinguishing the types of reactions and their mechanism will give an idea of the structural requirements of reactions of a particular type.
- The student will be able to write a reaction by explaining which bonds are broken and in what order.

Outcome:

- The students will get a thorough knowledge on the operating in the reactions of organic compounds and mechanism.
- Learn to identify the reaction mechanism
- Students can design new organic reactions based on the knowledge about reaction mechanism

Course Description:

The S_{NA}r mechanism – illustration with an example - benzyne mechanism – illustration with an example - S_{N1} and S_{N2} mechanisms – illustration with an example - neighboring group participation – Examples - Arenium ion mechanism – illustration with an example - Hammett equation – S_{E2} mechanism – illustration with an example - S_{E1} mechanism – illustration with an example - Addition reactions - illustration with an example - Elimination
reactions – mechanism – illustration with an example - E₁, E₂ mechanisms - illustration with an example -

Reference Books:

14CH2009 ORGANIC QUALITATIVE ANALYSIS LAB
Credits: 0:0:2
Objective:
- Enable to identify the functional group of the organic compound
- To obtain the practical skills in setting up of an organic reaction
- To prepare small organic molecules as derivatives
Outcome:
- Knowledge of systematic analysis of an organic compound
- The students will have the knowledge of identifying the functional groups of the organic compounds
- They will equip themselves in the preparation of simple organic compounds and understand their mechanism

12 approved experiments will be notified at the beginning of the semester

14CH2010 ORGANIC PREPARATIONS LAB
Credits: 0:0:2
Objective:
- Employ various reaction types to prepare organic compounds
- To train themselves in setting up of an organic reaction
- To have knowledge about handling the chemicals and laboratory scale preparations
Outcome:
- Understanding of the reaction conditions for various organic reactions
- They will equip themselves in the preparation of simple organic compounds
- They understand the mechanism of the reactions

12 approved experiments will be notified at the beginning of the semester

14CH2011 THERMODYNAMICS AND KINETICS
Credits: 3:0:0

Objective:
- To study the physical properties of solids
- To get thorough knowledge about the principles of chemical thermodynamics
- To study the chemical equilibrium and the chemical kinetics of reactions

Outcome:
- To know the physical characteristics of solids
- To understand the thermodynamic principles
- To understand the concepts of chemical equilibrium and chemical kinetics

Course Description:


Reference Books:


14CH2012 ELECTROCHEMISTRY, CATALYSIS AND COLLOIDAL CHEMISTRY

Credits: 3:0:0

Objective:
- To study the fundamental concepts of electrochemistry
To study the principles of quantum chemistry and surface chemistry
To study colloidal chemistry and phase equilibria

Outcome:
To get a basic knowledge about electrochemistry
To understand the theory involved in quantum chemistry and surface chemistry
To come to know about the colloidal solutions and phase equilibria of one and two component systems

Course Description:


Reference Books:

14CH2013 PHOTOCHEMISTRY, NUCLEAR CHEMISTRY AND CORROSION

Credits: 3:0:0

Objective:
To study the fundamental concepts of photochemistry
To study the principles of radiochemical reactions
To study the applied concepts of electrochemistry

Outcome:
To get a basic knowledge about photochemical reactions
To understand the concepts of radiochemistry and its applications
To understand the advanced applications of electrochemistry

Course Description:


Reference Books:

14CH2014  PHYSICAL CHEMISTRY LAB – I

Credits: 0:0:2

Objective:
- To train the students on instrumental methods of analysis
- To carryout experiments on chemical kinetics
- To get an basic idea about electrochemistry

Outcome:
- Understand the principle and working of various instrument methods of analysis.
- To apply the principle of chemical kinetics
- To apply the knowledge in measuring real samples

12 approved experiments will be notified at the beginning of the semester

14CH2015  PHYSICAL CHEMISTRY LAB – II

Credits: 0:0:2

Objective:
- To do experiments based on phase rule and absorption.
- To do experiments based spectrophotometry
- To gain some idea in distribution coefficient and equilibrium constant

Outcome:
- To apply principles of absorption, phase rule, distribution coefficient and equilibrium constant
- To understand applications of spectrophotometry
- To apply the knowledge in measuring real samples

12 approved experiments will be notified at the beginning of the semester
14CH2016 CHEMISTRY FOR CIVIL ENGINEERS

Credits: 3:0:0

Objective:
- To understand the application of composites as building materials
- To familiarize the student with various types of testing and treatment of water and sewage
- To impart the basic knowledge of chemical composition of building materials
- To learn the application of organic binders and paints

Outcome:
- Students will have the knowledge of chemistry concepts of building materials, organic binders and road marking paints
- Students will have complete understanding of the testing and treatment methods of water and sewage

Course Description:

Water quality analysis – pH, Total dissolved solids, Total suspended solids, Hardness, Determination of Na, K, Fe, Sulphate, chloride, fluoride, phosphate, silica content, BOD, COD


Reference Books:


14CH2017 CHEMISTRY FOR MECHANICAL AND AEROSPACE ENGINEERS

Credits: 3:0:0

Objective:
- To explain the fundamentals of Protective coatings and surface chemistry
- To get thorough knowledge about Composite materials and Alloys
Outcome:
- The students will know the phase rule and composition behind the various metal alloys
- Students will have the complete understanding of fabrication of polymer composites

Course Description:


Reference Books:

14CH2018 CHEMISTRY FOR ELECTRICAL AND ELECTRONICS ENGINEERS

Credits: 3:0:0

Objective:
- To know the significance of electromagnetic radiation and its interaction
- To understand the basic concepts about the photochemistry
- To know the importance of semiconductors and device fabrication
- To study the superconducting materials, lithography and energy storage devices
- To know about new generation materials used in LEDs and in other applications

Outcome:
- Students will have the wide spectrum of knowledge in electromagnetic radiation, photochemical reaction and its applications.
- The students will understand basic concepts of semiconductor, superconductors and LEDs.

Course Description:


Reference Books:


14CH2019 CHEMISTRY FOR COMPUTER ENGINEERS

Credits: 3:0:0

Objective:

- To know about fundamentals of materials chemistry and various classes of materials
- To study the characterization of materials by analytical techniques
- To know about photolithography and its applications

Outcome:

- The students will know the basics of materials chemistry
- The students will understand the application of materials in diversified fields

Course Description:


Reference Books:

14CH2020 CHEMISTRY FOR BIOLOGISTS

Credits: 3:0:0

Objective:
- To have a thorough knowledge in preparing solutions for analytical testing
- To get an idea about the applications of the chromatography and microscopy
- To enable the students to understand the concepts in physical and chemical processes in living systems
- To provide an introduction to the basic analytical tools needed for experiments in Biology.

Outcome:
- The students will have the fundamental ideas on preparation of solution which are essential for wet analytical science
- They will understand the applications of microscopy and chromatography
- They gain some rudimentary ideas on solutions, colloids, and surfaces which are essential for wet analytical science

Course Description:

Mole concept. Principle of volumetric analysis acidity, alkalinity and buffer solutions - Free energy, enthalpy and entropy. Energetics of Metabolism and ATP cycle – Chemical potential – Gibbs Duhem equation – Statements and applications of distribution laws (without derivation) – Physical significance - Adsorption- Langmuir and Freundlich isotherms. BET equation (no derivation) and its application to surface area measurement. Sols (reversible and irreversible), Emulsions and Emulsifiers, Association colloids (micelles), Gels - Applications of colloids - Paper, thin-layer, gel-filtration, ion-exchange, affinity and High-Performance Liquid Chromatography (HPLC). Principles of Light, confocal, fluorescence and electron microscopy

Reference Books:


14CH2021 CHEMISTRY FOR FOOD SCIENCE ENGINEERS

Credits: 3:0:0

Objective:
- To get an understanding about the chemistry involved in Foods and Dyes
- To have a thorough knowledge in preparing solutions for analytical testing of Food
- To get an idea about the applications of the chromatography and microscopy

Outcome:
- Students will understand the chemistry involved in modern foods and drinks
- They will have a knowledge about the pigments and dyes used in day today life
- Student will have an introduction to the basic analytical tools needed for experiments in Biology.

Course Description:


Reference Books:
14CH2022 STRUCTURAL CHEMISTRY FOR BIOLOGISTS

Credits: 3:0:0

Objective:
- This course will cater to the students learning Biology–related subjects as their main course, in providing them knowledge of the chemical structures of biomolecules and molecules involved in biochemical pathways.

Outcome:
- The student will be able to systematically name organic and biomolecules, identify them, and understand the importance of these molecules in biological pathways.
- They can understand the structural requirement of molecules and drugs in achieving physiological functions and pharmacological actions.
- Molecular mechanisms taught in biology will be better understood, through a chemistry approach with a newer vista.

Course Description:


Reference Books:


14CH2023 APPLIED NANOCHEMISTRY AND NEXT GENERATION MATERIALS
Credits: 3:0:0

Objective:
- The course will cover several key aspects of applied nanomaterials namely their synthesis, characterization, processing, and applications

Outcome:
- The students will know the various types of nanomaterials
- Students will have the complete understanding of properties and applications of nanomaterials

Course Description:

Reference Books: