### COURSE WISE BREAKUP

Fourth Year  Seventh Semester

**SPECILIZATION**  INORGANIC CHEMISTRY

#### THEORY

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<td>CHEM-452</td>
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#### PRACTICALS

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- **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: INORGANIC CHEMISTRY Code: CHEM-451

Credit Hours: 03 Marks: 100

Objective of the Program

After completing this program students will be able to learn the following:
1. Periodic Anomalies and Bonding in Electron deficient Compounds
2. Kinetics and Reaction Mechanism of Inorganic Reactions
3. Electron Transfer Reaction

Course Contents:

Periodic Anomalies and Bonding in Electron deficient Compounds

First- and second- row anomalies; the use of d- orbitals by non-metals; reactivity and d- orbital participation; pπ-dπ bonds; the use of p- orbitals in π- bonding; periodic anomalies of non-metals and post-transition metals. Multicenter bonding in electron deficient molecules, three centre two electron bond (3c-2e) and three-center, four-electron (3c-4e) bond model.

Kinetics and Reaction Mechanism of Inorganic Reactions

Classification of reaction mechanisms; rate laws; steady state approximation; inert and labile complexes; substitution reactions; octahedral complexes: acid hydrolysis, acid catalyzed aquation, anation reactions, base hydrolysis, attack on ligands, steric effects of inert ligands; square planar complexes: nucleophilic reactivity, trans-effect, cis-effect, effect of leaving group, mechanism of substitution, racemization reactions.

Electron Transfer Reactions

Electron transfer reactions in co-ordination compounds, mechanism of electron transfer reactions, outer sphere or tunneling mechanism, inner sphere or ligand bridge mechanism, factors effecting the rate of electron transfer reactions, two electrons transfer reactions, complementary or non complementary electron transfer reactions, oxidation reduction reactions of metal ions

RECOMMENDED BOOKS:


4th Year; 7th Semester

PAPER-II

Title of the Course: INORGANIC CHEMISTRY Code: CHEM-452

Credit Hours: 03 Marks: 100

Objective of the Program

After completing this program students will be able to learn and had a sound knowledge of the following:

1. Organic Reagents used in Inorganic Analysis, their selectivity, specificity etc.

2. Polymer Chemistry

Course Content:
Organic Reagents Used in Inorganic Analysis
Types of reagent, specificity and sensitivity of the reagents, methods of application with specific examples, complexometric and gravimetric methods involving various reagents, chelates and chelate-effect.

Polymer Chemistry
Molecular species: Introduction, homoatomic and heteroatomic inorganic polymers, chains and cages of Boron, Silicon, Nitrogen, Phosphorous and Sulphur; their synthesis, reactivity and applications, metal clusters. Polyionic species: Isopoly and heteropoly anions of transition metals, Silicates, borates, condensed phosphates, zeolites.

RECOMMENDED BOOKS:

4th Year; 7th Semester
PAPER-III
Title of the Course: INORGANIC CHEMISTRY Code: CHEM-453
Credit Hours: 03 Marks: 100
Objective of the Program
After completing this program students will be able to learn and able to interpret simple spectra.
1. Nuclear Magnetic Resonance Spectroscopy.
2. Ultra violet spectroscopy
3. Infrared spectroscopy
4. Mass Spectrometry
5. Thermal Analysis

Course Contents:

Instrumental Methods of Analysis

Physical methods in Inorganic Chemistry, TGA & DTA, NMR, IR, UV Spectroscopy, Mass Spectroscopy; Basic principles, Instrumentation and Applications

RECOMMENDED BOOKS:

PAPER-I
Title of the Practical: INORGANIC CHEMISTRY Code: CHEM-451
Credit Hours: 02 Marks: 50
1. Use of some organic reagents for the estimation of various elements
2. Preparation of at least six compounds/organometallic compounds in a pure state and determination of their state of purity
3. The experiments may be set making use of conductivity meter and potentiometer depending upon the availability.

PAPER-II
Title of the Practical: INORGANIC CHEMISTRY Code: CHEM-452
Credit Hours: 02 Marks: 50
1. Spectroscopic determination of some metal ions.
2. Recording and characterization of at least five organometallic compounds by IR and UV spectrophotometer to the subject of availability of facilities.
3. Estimation of different metals in food, tap water and brass etc. by Atomic Absorption Spectrometer/ flame photometer / UV / Visible spectrophotometer, subject to the availability of facilities.

PAPER-III
Title of the Practical: INORGANIC CHEMISTRY Code: CHEM-453
Credit Hours: 02 Marks: 50

RECOMMENDED BOOKS: