Credits: 4:0:0

Course Objectives:
- The various bonding theories in inorganic chemistry will be discussed
- Background on inorganic chemistry as applied to solid state chemistry will be discussed.
- The student will study the detailed account of nuclear chemistry and their application in various fields
- The student will understand the principles of metallurgy and will study the importance of lanthanides and actinides in detail

Course Outcome:
- The student will get the thorough knowledge of various bond theories, solid state chemistry, Nuclear chemistry, metal extraction techniques and the various properties of lanthanides and actinides

Unit I

Unit II

Unit III
Nuclear Chemistry: Modes of radioactive decay and rate of radioactivity decay – Radioactive detectors – Types of nuclear reactions – Artificial radioactivity – Nuclear stability – Packing fraction – Mass defects and binding energy – Nuclear fission of uranium - Liquid drop model – Nuclear fusion – Essential features of water cooled thermal reactors and fast breeders – Neutron activation analysis – Carbon and rock dating – Applications of tracers in chemical analysis, reaction mechanisms, medicine and industry

Unit IV
Metallurgy: Isolation, purification, properties and uses of Beryllium, Germanium, Titanium, Zirconium, Thorium, Vanadium, Uranium and Platinum. – Preparation and uses of the following compounds: Basic Beryllium acetate, BeCl₂, TiCl₄, TiO₂, Titanium isopropoxide, ZrCl₄, Zirconia, V₂O₅, VCl₄, UF₄, Uranylnitrate, ThO₂, Th(NO₃)₂, PtCl₄, H₂PtCl₆

Unit V
Chemistry of Lanthanides and Actinides: Lanthanides – Position in the periodic table – General properties of lanthanides and actinides – Electronic configuration, oxidation state and oxidation potential,
atomic and ionic radii – Cause and consequences of lanthanide and actinide contractions – Comparison of spectral and magnetic properties of lanthanide and actinide complexes – Chemistry of their important compounds: Oxides, nitrates and sulphates

Text Books:

Reference Books: