

Estd. June 1964



“Education for Knowledge, Science and Culture.”

– Shikshanmaharshi Dr. Bapuji Salunkhe

Shri. Swami Vivekanand Shikshan Sanstha's

**VIVEKANAND COLLEGE, KOLHAPUR
(AUTONOMOUS)**

2130 E, Tarabai Park, Tal. Karveer, Dist. Kolhapur 416 003

UGC Recognition Under 2 F & 12(B) UGC Act 1956

Affiliated to Shivaji University, Kolhapur (M.S.)

Ph.: 0231-2658612,2658840,Resi.: 0231-2653962 Fax:0231-2658840

Website : www.vivekanandcollege.ac.in E-mail : info@vivekanandcollege.org



Department of Chemistry

Course Outcomes (COs): Chemistry


M.Sc. Part II Inorganic Chemistry (Introduced in the year 2022-23)	
Semester III	
Inorganic Chemical Spectroscopy (CC - 2100C)	
CO No.	On completion of the course, student will be able to:
CO1	Interpret the symmetry elements and their operations as required to specify molecular symmetry and possible point groups from symmetry elements and be able to find point group of molecules by systematic procedure.
CO2	Explain the principle and instrumentation of infra-red (IR) and Raman spectroscopy and interpret infrared and raman spectra for chemical analysis inorganic compounds.
CO3	Explain the principle and instrumentation of Mass spectroscopy and interpret Mass spectrum for chemical analysis of inorganic compounds.
CO4	Explain the principle and instrumentation of nuclear magnetic resonance (NMR) and X-ray photoelectron spectroscopy (XPS) and interpret the spectrum for chemical analysis of inorganic compounds.
Organometallic and Bioinorganic Chemistry (CC - 2101C)	
CO No.	On completion of the course, student will be able to:
CO1	Explain methods of properties, preparation, stability and applications of organometallic compounds in organic synthesis.
CO2	Interpret structure and bonding transition metal pi-complexes and their applications in organic synthesis relating to nucleophilic and electrophilic attack on ligands.
CO3	Get a basic understanding of medicinal use of metal complexes as

	antibacterial, antiviral, antibiotics and related compounds.
CO4	Understand transport and storage of dioxygen through different carriers, study electron transfer in Biology involving metalloproteins and cytochromes and role of metals in medicine.
Coordination Chemistry - I (CC - 2102C)	
CO No.	On completion of the course, student will be able to:
CO1	Know the fundamentals in photochemistry and explain different types of photochemical reactions and photochemistry of coordination compounds.
CO2	Explain non-chelate forming and chelate forming reactions.
CO3	Understand magnetic properties of complexes and explain w. r. t. spin orbit coupling.
CO4	Understand and explain mixed ligand complexes and use of transition metal complexes in catalysis.
Material Science (CC - 2103C)	
CO No.	On completion of the course, student will be able to:
CO1	Explain mechanism of superconductors, classify super conductors, and explain BCS theory of superconductivity and know the applications of different materials.
CO2	Explain magnetic materials and their applications in different fields.
CO3	Explore new areas of research in both ceramics and composite materials manufacturing.
CO4	Understand and apply core principles and concepts in catalysis using different inorganic complexes as catalyst.
Nuclear Chemistry (CC - 2104C)	
CO No.	On completion of the course, student will be able to:
CO1	Understand types of radioactive decay, natural decay series, nuclear models, nuclear properties, Mass energy, relationships, nuclear reactions, rates of radioactive decay, interaction of radiation with matter.
CO2	Explain nuclear structure and stability, define binding energy and mass defect and able to calculate each for a given nucleus. Also understand nuclear models to understand nuclear structure and their properties.
CO3	Identify and define various types of nuclear changes or processes including fission, fusion and decay reactions, to understand nuclear

	reactions and mechanism behind that.
CO4	Understand the basics of nuclear chemistry applications: nuclear power, nuclear reactor, medical treatment, isotopic labelling, and carbon dating.
Semester IV	
Instrumental Techniques (CC - 2106D)	
CO No.	On completion of the course, student will be able to:
CO1	Understand and use various crystallographic databases. Process data, solve and interpret a single crystal structure. Apply the concepts of unit cells and lattices to describe observed diffraction patterns in reciprocal space.
CO2	Acquire knowledge of Nuclear Quadrupole Resonance and X-ray fluorescence Spectroscopy and apply to interpret data.
CO3	Understand the principal, instrumentation and apply for structural elucidation and investigation of compounds.
CO4	Understand ESR measurements, acquire information about the existence of unpaired electrons, as well as quantities, type, nature, environment and behaviour and to interpret structure.
Coordination Chemistry-II (CC - 2107D)	
CO No.	On completion of the course, student will be able to:
CO1	Explain lability and inertness of complexes and with respect to VBT and CFT.
CO2	Explain the kinetics and mechanism of substitution and electron transfer reactions in octahedral and square planar complexes.
CO3	Understand the classification of coordination polymers and learn the chemical background of individual polymers.
CO4	Know the applications of coordination compounds in industrial processes.
Energy and Environmental Chemistry (CC - 2108D)	
CO No.	On completion of the course, student will be able to:
CO1	Understand the basic building blocks of various forms of energy and to know applications of fuel cells in various sectors, hydrogen production, storage, handling and safety issues.
CO2	Understand energy storage systems and describe the parts in various Li-Ion Battery, materials and functionalities.
CO3	Explain the common principles, routes and processes in controlling

	the gaseous pollutants.
CO4	Understand meaning of important parameters for measuring water quality and understand the principles and the practical approaches and technique required to effectively monitor the chemical, hydrological and microbiological elements of water quality.
Inorganic Nanomaterials (CC - 2109D)	
CO No.	On completion of the course, student will be able to:
CO1	Understand synthesis approaches of nanomaterials and challenges in Nano Technology.
CO2	Describe different characterization techniques of materials, outline the principles on which they are based, and explain their limitations.
CO3	Understand the technological application of nanomaterial is usable in multiple sectors, from healthcare and mechanics to environmental preservation and air purification.
CO4	Acquire knowledge about the toxicity in Nanoscience, and their effects on Human as well as learn various concepts of toxicity, and its effects.




 Dr. (Mrs). S, D, Shirke
HEAD
 DEPARTMENT OF CHEMISTRY
 VIVEKANAND COLLEGE, KOLHAPUR
 (EMPOWERED AUTONOMOUS)