

GDC Memorial College, Bahal (Bhiwani)

NAAC Accredited Grade 'B'

Department of Chemistry

Course Outcomes, Program Outcomes and Program Specific Outcomes

M.Sc. (Chemistry) 1st Sem.

Subject: Inorganic Chemistry

Subject Code: 19CHE-101

Course Outcomes (CO)

After successful completion of the course, the student is expected to:

CO1: Learn about different concepts of Group Theory

CO2: Learn the fundamentals and applications of Stereochemistry and Bonding in Main Group Compounds

CO3: Learn about the Metal Ligand Equilibria in solution and Metal-Ligand Bonding

CO4: Understand the Reaction Mechanism of Transition Metal Complexes-I

CO5: Understand the concepts of reactions without metal ligand bond cleavage, racemization of tris chelate complexes.

M.Sc. (Chemistry) 1st Sem.

Subject: Physical Chemistry

Subject Code: 19CHE-102

Course Outcomes (CO)

After successful completion of the course, the student is expected to:

CO1: Learn about different concepts of quantum mechanics like operators particles in box etc.

CO2: Learn the fundamentals and applications of thermodynamics and its utility in reaction mechanism.

CO3: Learn about the kinetics of different order reaction.

CO4: Understand the mechanism of chain reaction.

CO5: Understand the concepts of advanced electrochemistry and their uses.

M.Sc. (Chemistry) 1st Sem.

Subject: Organic Chemistry

Subject Code: 19CHE-103

Course Outcomes (CO)

After successful completion of the course, the student is expected to:

- CO1:** Learn about different concepts of nature of bonding in organic molecules
CO2: Learn the fundamentals and applications of structure and reactivity
CO3: Learn about the aliphatic nucleophilic and electrophilic substitution
CO4: Understand the molecular symmetry and chirality. D-L, R-S, E-Z and threo-erythro nomenclature
CO5: Understand the concepts of auxiliary, substrate, reagent and catalyst controlled

M.Sc. (Chemistry) 1st Sem.

Subject: Spectroscopy-I

Subject Code: 19CHE-104

Course Outcomes (CO)

After successful completion of the course, the student is expected to:

- CO1:** Learn about Introduction and understanding of UV-Visible phenomenon
CO2: Learn the fundamentals and applications of Infrared Spectroscopy
CO3: Learn about the Nuclear Magnetic Resonance Spectroscopy
CO4: Understand the Mass Spectrometry
CO5: Understand the concepts of Carbon-13 NMR Spectroscopy and Heteronuclear Coupling

Program Outcomes (PO)

After successful completion of two year degree program in chemistry students should be able to;

- PO1:** Understand the three laws of thermodynamics.
PO2: Learn the phase equilibrium and phase diagrams.
PO3: Learn the enzymatic reaction and their mechanism.
PO4: Able to understand basic terms in computer science
PO5: Able to solve statistical problems like mean, median and mode
PO6: Learn different type of rearrangement reaction and mechanism

Program Specific Outcomes (PSO)

After completion of these courses students will able to:

- PSO1:** Able to understand different type of theories which help them in competitive exam.
PSO2: Basic reaction mechanism will help students to carry out experiments in various research fields.
PSO3: Statistical analysis will help out in research are and data analysis.
PSO4: Students will also learn basic concepts of computer and IT skills.
PSO5: Inorganic specialization will help students to select their future option.
PSO6: Students will be capable of presentation on the topic assigned; use of board or power point presentation.

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Department of Chemistry

Course Outcomes, Program Outcomes and Program Specific Outcomes

M.Sc. (Chemistry) 2nd Sem.

Subject: Inorganic Chemistry-II

Subject Code: 19CHE-201

Course Outcomes (CO)

After successful completion of the course, the student is expected to:

CO1: Learn about different concepts of Reaction Mechanism of Transition Metal Complexes-II

CO2: Learn the fundamentals and applications of Magnetic Properties of transition metal complexes

CO3: Learn about the Electronic Spectra and Magnetic Properties of Transition Metal Complexes

CO4: Understand the Metal π - Complexes

CO5: Understand the concepts of Metal Clusters

M.Sc. (Chemistry) 2nd Sem.

Subject: Physical Chemistry-II

Subject Code: 19CHE-202

Course Outcomes (CO)

After successful completion of the course, the student is expected to:

CO1: Learn about different concepts of Third law of thermodynamics, Nernst heat theorem, concept of absolute entropy

CO2: Learn the fundamentals and applications of Chemical Dynamics

CO3: Learn about the Statistical Mechanics

CO4: Understand the Laws of photochemistry

CO5: Understand the concepts of Stern Volmer equation

M.Sc. (Chemistry) 2nd Sem.

Subject: Organic Chemistry

Subject Code: 19CHE-203

Course Outcomes (CO)

After successful completion of the course, the student is expected to:

CO1: Learn about different concepts of Aromatic Electrophilic Substitution

CO2: Learn the fundamentals and applications of Elimination Reactions

CO3: Learn about the Addition to Carbon-Carbon Multiple Bonds

CO4: Understand the Addition to Carbon-Hetero Multiple Bonds

CO5: Classification and general mechanistic treatment of nucleophilic

M.Sc. (Chemistry) 2nd Sem.

Subject: Statistics for Chemists

Subject Code: 19CHE-204

Course Outcomes (CO)

After successful completion of the course, the student is expected to:

CO1: Learn about different concepts of Measures of Central Tendency

CO2: Learn the fundamentals of Random variables, Discrete Probability distributions

CO3: Learn about the Simple and Composite Hypotheses, Null and Alternative Hypotheses

CO4: Understand the Karl Pearson and Spearman Rank Correlation

CO5: Understand the concepts of Regression Analysis

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NAAC Accredited Grade 'B'

Department of Chemistry

Course Outcomes, Program Outcomes and Program Specific Outcomes

M.Sc. (Chemistry) 3rd Sem.

Subject: Spectroscopy-II

Subject Code: 19CHE-301

Course Outcomes (CO)

After successful completion of the course, the student is expected to:

CO1: Learn about rotational and vibrational spectra for different molecules.

CO2: Learn about the Vibrational-Rotational spectra and the concept of harmonicity.

CO3: Learn about the raman and electronic spectra of different molecules.

CO4: Understand the electron spin resonance spectroscopy and Mossbaur spectroscopy.

CO5: Understand the concept of Atomic absorption spectroscopy , flame photometry and Colorimetry.

M.Sc. (Chemistry) 3rd Sem.

Subject: Organotransition Metal Chemistry

SubjectCode: 19CHE-302

Course Outcomes (CO)

After successful completion of the course, the student is expected to:

CO1: Understand and Classify the Organometallic Compounds

CO2: Learn about the Alkyls and aryls of Transition Metals.

CO3: Learn about the transition metal pi Complexes.

CO4: Learn about the Compounds of Transition Metal-Carbon Multiple Bonds .

CO5: Learn about the Homogenous Catalysis.

M.Sc. (Chemistry) 3rd Sem.

Subject: Instrumental Techniques-I

SubjectCode: 19CHE-305

Course Outcomes (CO)

After successful completion of the course, the student is expected to:

CO1: Learn about the different method of analysis like Electroanalytical Methods.

CO2: Learn about the different types of titration and titration curve.

CO3: Learn about the polarography, voltammeter.

CO4: Understand the principles of Chromatography and its uses.

CO5: Learn about the different Thermal Techniques.

M.Sc. (Chemistry) 3rd Sem.

Subject: Modern Concepts of Inorganic Chemistry

Subject Code:19CHE-308

Course Outcomes (CO)

After successful completion of the course, the student is expected to:

CO1: Learn about the different inorganic polymers and non aqueous solvents.

CO2: Learn about the isopoly and heteropoly Acids and salts..

CO3: Learn about the basics of photochemistry.

CO4: Understand about the sewage treatment and fertilizers.

CO5: Learn about the radioactivity and nuclear chemistry.

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Department of Chemistry

Course Outcomes, Programme Outcomes and Programme Specific Outcomes

M.Sc. (Chemistry) 4th Sem.

**Subject: Inorganic Chemistry Special-IV
(Bioinorganic and Medicinal Chemistry)**

Subject Code: 19CHE-401

Course Outcomes (CO)

After successful completion of the course, the student is expected to:

CO1: Understand Bioinorganic chemistry of Na⁺, K⁺, Mg²⁺ and Ca²⁺.

CO2: Able to understand Electron Transfer in Biological Systems.

CO3: Able to know about Fixation of dinitrogen biologically and abiologically.

CO4: Able to understand Biochemical basis of essential metal deficient diseases like Iron, copper and zinc deficiencies.

CO5: Know about different classes of Inorganic drugs like Inorganic drugs in dental carries, Inorganic compounds as antacids.

CO6: Learn about Anticancer activity and mechanism of platinum complexes.

CO7: Able to understand Antibacterial and antiviral properties of metal complexes.

M.Sc. (Chemistry) 4th Sem.

**Subject: Inorganic Chemistry Special-V
(Instrumental Techniques –II)**

Subject Code: 19CHE-404

Course Outcomes (CO)

After successful completion of the course, the student is expected to:

CO1: Able to understand use of symmetry to determine the number of active infrared and Raman lines.

CO2: Learn about Application of resonance Raman Spectroscopy particularly for the study of active sites of metalloproteins as myoglobin and haemoglobin.

CO3: Learn structural elucidation of inorganic compounds using NQR spectroscopy.

CO4: Able to understand Magnetic Resonance Imaging by applications of NMR (¹⁹F, ³¹P).

M.Sc. (Chemistry) 4th Sem.

**Subject: Inorganic Chemistry Special-VI
(Advance Topics in Inorganic Chemistry)**

Subject Code: 19CHE- 407

Course Outcomes (CO)

After successful completion of the course, the student is expected to:

CO1: Develop new pharmaceutical therapies by understanding the interactions at a drug binding site.

CO2: Know about Molecular receptors for different types of molecules.

CO3: Able to design and synthesis of co-receptor molecules.

CO4: Know about properties of nano structured materials (opticals, magnetic, chemical and photo catalytic properties).

CO5: Able to know techniques for Nano materials synthesis (Hydrothermal, Solvothermal, solgel, Physical Vapour deposition (PVD) etc.

CO6: Able to understand characterization of nanomaterials by X-ray diffraction(XRD), Scanning Electron Microscope (SEM), Transmission Electron Microscope (TEM) etc.

CO7: Able to apply nanoscience and nanotechnology in various fields.

CO8: Understand Defects and Non-stoichiometry in Solid State.

CO9: Learn about Metals, insulators and semiconductors and their Optical and Magnetic properties.

M.Sc. (Chemistry) 4th Sem.

Subject: Communication Skills

Subject Code: 19CHE-410

Course Outcomes (CO)

After successful completion of the course, the student is expected to:

CO1: To enable the students to communicate effectively and conduct themselves graciously in the business of life.

CO2: Preparing for interviews, CV/ Biodata, Group Discussion.

CO3: Enable art of Small Talk, Participating in Conversations.

CO4: Recognizing and Managing Emotions and situations like Stress and Anger Management

CO5: Understand Personality Development Skills like Personal Grooming, Assertiveness, Improving Self-Esteem.

CO6: Learn about significance of Critical Thinking.

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