

Mapping of the courses to Employability



Hindi Vidya Prachar Samiti's
Ramniranjan Jhunjhunwala College
Of Arts, Science & Commerce
(Autonomous College)

Affiliated to
UNIVERSITY OF MUMBAI

Mapping of the courses to Employability

Program: M.Sc. PHYSICAL CHEMISTRY

Program Code: RJSPGCHEP

(CBCS 2020-2021)

Mapping of the courses to Employability

Mapping of the courses to Employability / Entrepreneurship / Skill Development

Name of the Program M.Sc PHYSICAL CHEMISTRY

Class	Course Name	Course Code	Topics focusing on Employability / Entrepreneurship / Skill development	Employability / Entrepreneurship / Skill development
M.Sc. Sem-I	Chemistry	RJSPGCHE101	1. Thermodynamics-I 2. Quantum Chemistry 3. Chemical Dynamics-I 4. Electrochemistry, Employability in the field of electrochemistry	
		RJSPGCHE102	1. Chemical Bonding 2. Molecular Symmetry and Group Theory 3. Materials Chemistry and Nanomaterials 4. Characterisation of Coordination compounds Students study the nature of various bonds, the solid molecular structures, their symmetry and characterization. They also study about nano materials.	
		RJSPGCHE103	Physical Organic Chemistry, Nucleophilic substitution reactions and Aromaticity, Stereochemistry, Oxidation and Reduction Students can understand the importance of chirality concepts, reagents used and the mechanism in organic reactions.	
		RJSPGCHE104	1. Language of Analytical Chemistry, Quality in Analytical Chemistry 2. Calculations based on Chemical Principles. 3. Optical Methods, Spectroscopy 4. Thermal Methods Students learn to handle analytical instruments. Employability as chemist in analytical instrumental laboratories	
M.Sc. Sem-II	Chemistry	RJSPGCHE201	1. Chemical Thermodynamics II 2. Quantum Chemistry II 3. Chemical Kinetics & Molecular Reaction Dynamics 4. Solid State Chemistry and Phase Equilibria	
		RJSPGCHE202	1. Inorganic reaction mechanism	

Mapping of the courses to Employability

			<p>2.Organometallic chemistry of transition metals</p> <p>3.Environmental chemistry</p> <p>4.Bio-inorganic chemistry</p> <p>Students learn ligand substitution reactions, their rates, applications of organometallic compounds, role of metal ions in biological systems and radiation hazards and other environmental issues.</p>
		RJSPGCHE203	<p>Alkylation of Nucleophilic Carbon Intermediates, Reaction of carbon nucleophiles with carbonyl groups, Reactions and Rearrangements, introduction to Molecular Orbital Theory for Organic Chemistry and Spectroscopy. Students understand molecular orbital theory of organic molecules, nucleophilic substitution reactions and rearrangement in organic reactions, application of Spectroscopy to solve different problems.</p>
		RJSPGCHE204	<p>1. Chromatography</p> <p>2. X-ray spectroscopy, Mass spectrometry. Radioanalytical Methods</p> <p>3. Surface Analytical Techniques, Atomic Spectroscopy.</p> <p>4. Electroanalytical Methods, Ion selective potentiometry and Polarography.</p> <p>Electrogravimetry, Coulometry.</p> <p>Students learn various analytical techniques and their applications in different fields.</p>
M.Sc.	Chemistry	RJSPGCHEP301	<p>Paper I: Polymer, surface and photochemistry</p> <p>Students learn different methods to determine molecular methods, applications of surface active agent and applications of photochemistry.</p>
Sem III		RJSPGCHEP302	<p>Nanochemistry, statistical mechanics & Nuclear chemistry</p> <p>Students understand the properties and application of nanoparticles.</p> <p>Students learn fundamentals of Statistical thermodynamics and applications of nuclear chemistry.</p>

Mapping of the courses to Employability

		RJSPGCHEP303	Atomic and Molecular: Structure and Spectroscopy Student learn applications of different quantum theories to evaluate structure of multi electron atom. Students understand application of spectroscopy to determine geometry of molecules.
		RJSPGCHEP304	Advanced Instrumental Techniques Students understand principles and applications of different spectral , polarography and radio analytical methods.
M.Sc.	Chemistry	RJSPGCHEP401	Polymer, Green, Biophysical and Applied Student understand properties of polymers in solid state, characterization of polymers by using spectral, microscopic, thermal and chemical methods. Student learn methods and techniques of polymer technology, green chemistry and biophysical chemistry
Sem IV		RJSPGCHEP402	Material Science, network and irreversible thermodynamics Students learn properties and preparation techniques of solid and metal alloy. Students learn fundamentals of irreversible thermodynamics.
		RJSPGCHEP403	Symmetry & Spectroscopy Students learn applications of symmetry point group to determine geometry of molecules. Spectroscopic application for structure and energy calculations.
		RJSPGCHEP404	Intellectual property rights and cheminformatics Student awareness and understanding the terms like intellectual property, patents, copyright, industrial designs, trademarks, geographical indications
M.Sc.	Chemistry	RJSPGCHEPR101	Learning of advanced concepts and skill development (Determination of solubility products, potentiometry & conductometry).
Sem I		RJSPGCHEPR102	Ores and alloys and Instrumental analysis, Students learn to handle

Mapping of the courses to Employability

			instruments like potentiometer and to perform redox titrations. They also learn to analyse the various metal contents in a given ore/alloy sample.
		RJSPGCHEPR103	Organic Preparations, understanding of synthesis, effect of reaction parameters including stoichiometry, and safety aspects including MSDS . Purification of product ,melting point.
		RJSPGCHEPR104	Students learn to carry out assay by Volhard's method. Statistical method. to determine the ion exchange capacity, to carry out quantitative complexometric titrations.
M.Sc. Sem II	Chemistry	RJSPGCHEPR201	Learning of advanced concepts, skill development and employability (Catalysis, CMC determination, phase diagrams & plots of atomic orbitals)
		RJSPGCHEPR202	Inorganic preparation of metal complexes (Synthesis and characterisation & Instrumentation. Students learn to synthesis and characterize metal complexes and learn to handle potentiometer and conductometer.
		RJSPGCHEPR203	Separation of Binary mixture using micro-scale technique. Students Understand the chemical separation techniques of organic binary mixtures & develop the skill in purification techniques.
		RJSPGCHEPR204	Students learn to handle instruments like Potentiometer, colorimeter, spectrophotometer and flame photometer
M.Sc. Sem III	Chemistry	RJSPGCHEPRP301	Determination of formula of a complex, transport number and isoelectric point Students understand the standard operating procedure of Hittorf's method, partition method and viscosity measurements of amino acids.
		RJSPGCHEPRP302	Determination of mean ionic activity, equilibrium constant & partial molar volume; construction of a phase diagram Students understand the standard operating procedure of potentiometer

Mapping of the courses to Employability

			and phase rule method. Students learn to interpret and analyse phase diagram.
		RJSPGCHEPRP303	Determination of dissociation constant, advanced conductometry, pHmetry & potentiometry Student learn various physical parameters by instrumental (conductometry, pH metry & potentiometry) and non- instrumental methods (activation energy, stability constant).
		RJSPGCHEPRP304	Cryoscopic method and advanced kinetics Student learn cryoscopic methods and various physical parameters by instrumental Colorimetry & spectrophotometry.
M.Sc.	Chemistry	RJSPGCHEPRP401	Conductometry and pH metry Students learn techniques of advanced conductometry and pH metry
Sem IV		RJSPGCHEPRP402	Phase rule and potentiometry Student learn to construct phase diagram; determination of activation energy and Van't Hoff factor; advanced potentiometry
		RJSPGCHEPRP403	Interpretation of spectra/data Students learn interpretation of spectra, TGA & DTA curve
		RJSPGCHEPRP404	Project evaluation