DEPARTMENT OF CHEMISTRY
M. Sc. Chemistry
Courses offered 2017 – 2020

Semester	Subject code	Title of the paper	Hours/week	Credit
I	PG1711	Core I Organic Chemistry –I	6	4
	PG1712	Core II Inorganic Chemistry – I	6	5
	PG1713	Core III Physical Chemistry – I	6	4
	PG1714 PG1715	Elective I (a) Instrumental Methods of Analysis (b) Electrochemistry	6	4
	PG17P1	Practical I Organic Chemistry	6	-
II	PG1721	Core IV Organic Chemistry – II	6	4
	PG1722	Core V Inorganic Chemistry – II	6	5
	PG1723	Core VI Physical Chemistry – II	6	4
	PG1724 PG1725	Elective II (a) Research Methodology (b) Nuclear Chemistry	6	4
	PG17P1	Practical I Organic Chemistry	-	5
	PG17P2	Practical II Inorganic Chemistry	6	5
	LST172	Life Skill Training (LST) – I	-	1
III	PG1731	Core VII Organic Chemistry – III	6	5
	PG1732	Core VIII Physical Chemistry –III	6	4
	PG1733 PG1734	Elective III (a) Advanced Topics in Chemistry (b) Medicinal Chemistry	6	4
	PG17P3	Practical III Gravimetric analysis and Inorganic preparations	4	-
	PG17PR	Project and Viva	8	4
IV	PG1741	Core IX Organic Chemistry – IV	6	4
	PG1742	Core X Inorganic Chemistry – III	6	5
	PG1743	Core XI Physical Chemistry –IV	6	4
	PG1744 PG1745	Elective IV (a) Energy for the Future (b) Nanochemistry	6	4
	PG17P3	Practical III Gravimetric analysis and Inorganic preparations	-	4
	PG17P4	Practical IV Physical Chemistry	6	5
	LST174	Life Skill Training (LST) – II	-	1
	STP171	Summer Training Programme	-	1
		TOTAL	**120**	**90**

M.Sc. Programme Outcome (POs)

PO No.	Upon completion of M.Sc. Degree Programme, the graduates will be able to :
PO - 1	Recognize the scientific facts behind natural phenomena.
PO - 2	Relate the theory and practical knowledge to solve the problems of the society.
PO - 3	Prepare successful professionals in industry, government, academia, research, entrepreneurial pursuits and consulting firms
PO - 4	Face and succeed in high level competitive examinations like NET, GATE and TOFEL.
PO - 5	Carry out internship programme and research projects to develop scientific skills and innovative ideas.
PO - 6	Utilize the obtained scientific knowledge to create eco-friendly environment.
PO - 7	Prepare expressive, ethical and responsible citizens with proven expertise

M. Sc. Chemistry Programme Specific Outcome (PSOs)

PSO No.	Programme Outcomes Upon completion of M.Sc Chemistry, students will be able to:	PO Addressed
PSO - 1	Impart indepth knowledge about various aspects of chemistry within an environment committed to excellence.	PO - 1
PSO - 2	Develop critical thinking, technical skills and innovative ideas in analyzing and solving problems in the field of chemistry.	PO - 2
PSO - 3	Design, synthesize and characterize chemical compounds in medicine, biology and industry.	PO - 5
PSO - 4	Explore new areas of research in chemistry and other disciplines of science and technology across the globe with professional competency.	PO - 4
PSO - 5	Develop entrepreneurial skills, empowerment according to the requirement and become self-reliant.	PO - 3
PSO - 6	Develop an understanding of eco-friendly chemical processes and impact of chemistry on health and environment.	PO - 6

Course Outcomes (COs)

Semester : I Major Core I

Name of the Course : Organic Chemistry I

Course code : PG1711

CO No.	Course Outcomes Upon completion of this course, the students will be able to:	PSO Addressed	CL
CO - 1	Correlate the impact of displacement of electrons with the physico-chemical properties, nature and stability of organic compounds	PSO - 1	An
CO - 2	Synthesize organic compounds by applying the concept of chirality	PSO - 3	C
CO - 3	Illustrate the conformational analysis of cyclic and acyclic systems	PSO - 1	Ap
CO - 4	Infer the mechanism of electrophilic addition reaction.	PSO - 1	An
CO - 5	Interpret the kinetic and thermodynamic aspects of reaction mechanisms in organic compounds	PSO - 3	Ap

Semester : I Major Core II

Name of the Course : Inorganic Chemistry I

Course code : PG1712

CO No.	Course Outcomes Upon completion of this course, the students will be able to:	PSO Addressed	CL
CO - 1	Categorise the general characteristics and aqueous chemistry of transition elements.	PSO - 1	An
CO - 2	Predict various substitution reactions in coordination complexes and its applications.	PSO - 4	C
CO - 3	Evaluate the stability of transition metal complexes and bonding in metallocenes	PSO - 1	E
CO - 4	Correlate the different types of solids and their properties.	PSO - 2	An
CO - 5	Synthesize organometallic compounds, Inorganic chains, Rings, Cages and Clusters and discuss its structures.	PSO - 3	C

Semester : I Major Core III

Name of the Course : Physical Chemistry I

Course code : PG1713

CO No.	Course Outcomes Upon completion of this course, the students will be able to:	PSO Addressed	CL
CO - 1	Compare thermodynamics and phase rule.	PSO - 1	An
CO - 2	Deduce various relations of statistical thermodynamics.	PSO - 2	An
CO - 3	Differentiate the kinetics of chemical reactions and processes.	PSO - 1	An
CO - 4	Relate quantum mechanical postulates and operators.	PSO - 1	E
CO - 5	Apply Schrodinger wave equation for particle in 1, 3 D-box and simple harmonic oscillator.	PSO - 4	Ap
CO - 6	Relate the electrical aspects of surface chemistry.	PSO - 6	Ap

Semester : I Elective I (a)

Name of the Course : Instrumental Methods of Analysis

Course code : PG1714

CO No.	Course Outcomes Upon completion of this course, the students will be able to:	PSO Addressed	CL
CO - 1	Apply the chromatographic techniques to chemical compounds	PSO - 1	Ap
CO - 2	Correlate the principles and applications of ion-exchange chromatography, HPLC and GC	PSO - 4	An
CO - 3	Detect the concentration, purity and thermal stability of compounds using different instrumental techniques	PSO - 5	An
CO - 4	Predict the concentration of photoactive compounds using spectrophotometric analysis.	PSO - 3	C
CO - 5	Compare the principles and instrumentation of various spectroscopic techniques	PSO - 2	An

Semester : I Elective I (b)

Name of the Course : Electrochemistry

Course code : PG1715

CO No.	Course Outcomes Upon completion of this course, the students will be able to:	PSO Addressed	CL
CO - 1	Categorize electrochemical reactors used in industry	PSO - 3	An
CO - 2	Apply electrochemistry in hydrometallurgy and pyrometallurgy	PSO - 1	Ap
CO - 3	Differentiate electroplating and electroless plating	PSO - 2	An
CO - 4	Determine primary and secondary batteries	PSO - 1	An
CO - 5	Construct fuel cells	PSO - 5	C
CO - 6	Generalize the methods for prevention of corrosion	PSO - 6	Ap

Semester : II Major Core IV

Name of the Course : Organic Chemistry II

Course code : PG1721

CO No.	Course Outcomes Upon completion of this course, the students will be able to:	PSO Addressed	CL
CO - 1	Determine the mechanism of nucleophilic substitution reactions	PSO - 1	An
CO - 2	Predict the aromaticity and nomenclature of novel ring systems	PSO - 2	C
CO - 3	Analyze the mechanism of various organic name reactions	PSO - 3	An
CO - 4	Categorize the functions and characteristics of bio-active molecules	PSO - 6	An
CO - 5	Infer steroids and sex-hormones	PSO - 1	An

Semester : II Major Core V

Name of the Course : Inorganic Chemistry II

Course code : PG1722

CO No.	Course Outcomes Upon completion of this course, the students will be able to:	PSO Addressed	CL
CO - 1	Compare the properties and similarities of Lanthanides and Actinides	PSO - 2	An
CO - 2	Correlate the photochemistry of transition metal complexes	PSO - 2	An
CO - 3	Assess the importance of metals in biological reactions in bioinorganic compounds	PSO - 6	E
CO - 4	Interpret IR and Raman Spectroscopy to clarify molecular structure and properties	PSO - 3	Ap
CO - 5	Systematise the applications of ESCA and illustrate the principle of photoelectron spectroscopy of inorganic compounds and	PSO - 3	C
CO - 6	Propose term symbols and selection rules for inorganic compounds	PSO - 4	C

Semester : II Major Core VI

Name of the Course : Physical Chemistry II

Course code : PG1723

CO No.	Course Outcomes Upon completion of this course, the students will be able to:	PSO Addressed	CL
CO - 1	Analyze the principles and applications of electrochemistry	PSO - 1	An
CO - 2	Generalise corrosion and its prevention	PSO - 6	Ap
CO - 3	Construct fuel cells and its applications	PSO - 4	C
CO - 4	Deduce photochemical processes	PSO - 6	An
CO - 5	Differentiate homogeneous and heterogeneous catalysis	PSO - 1	An
CO - 6	Apply quantum mechanics to various molecules	PSO - 2	Ap

Semester : II Elective II (a)

Name of the Course : Research Methodology

Course code : PG1724

CO No.	Course Outcomes Upon completion of this course, the students will be able to:	PSO Addressed	CL
CO - 1	Utilize the sources of information related to research	PSO - 4	Ap
CO - 2	Prepare OHP, Power point and project reports	PSO - 5	C
CO - 3	Solve problems related to errors in statistical analysis	PSO - 2	E
CO - 4	Predict the particle size, structure and surface morphology of compounds using spectroscopic and microscopic techniques	PSO - 3	C
CO - 5	Apply the features of computer in research	PSO - 4	Ap
CO - 6	Employ the applications of cheminformatics	PSO - 5	Ap

Semester : II Elective II (b)

Name of the Course : Nuclear Chemistry

Course code : PG1725

CO No.	Upon completion of this course, the students will be able to:	PSO Addressed	CL
CO - 1	Detect radioactivity using various detectors	PSO - 1	An
CO - 2	Analyze the types of nuclear reactions	PSO - 1	An
CO - 3	Generalize nuclear reactions and nuclear waste management	PSO - 6	Ap
CO - 4	Determine radiolysis of solids, liquids and gases	PSO - 2	An
CO - 5	Apply radioisotopes in industries and daily life	PSO - 3	Ap

Semester : II Practical I

Name of the Course : Organic Chemistry

Course code : PG17P1

CO No.	Upon completion of this course, the students will be able to:	PSO Addressed	CL
CO - 1	Separate binary mixtures of organic compounds	PSO - 2	An
CO - 2	Analyze the functional groups present in organic compounds by semi micro analysis.	PSO - 1	An
CO - 3	Estimate various organic compounds.	PSO - 2	An
CO - 4	Prepare organic compounds using various rearrangement reactions	PSO - 3	C
CO - 5	Evaluate the purity of organic compounds.	PSO - 3	An

Semester : II Practical II
Name of the Course : Inorganic Chemistry
Course code : PG17P2

CO No.	Upon completion of this course, the students will be able to:	PSO Addressed	CL
CO - 1	Analyze inorganic mixture by semi micro qualitative analysis.	PSO - 1	An
CO - 2	Develop skill in estimating the presence of various elements.	PSO - 2	C
CO - 3	Estimate the elements by photocolorimetric method.	PSO - 2	An
CO - 4	Identify inorganic cations in a binary mixture.	PSO - 1	R
CO - 5	Separate the binary mixture of inorganic cations by paper chromatography.	PSO - 4	Ap

Semester : III Major Core VII
Name of the Course : Organic Chemistry III
Course code : PG1731

CO No.	Course Outcomes Upon completion of this course, the students will be able to:	PSO Addressed	CL
CO - 1	Determine the structure of organic compounds using UV and IR spectroscopy	PSO - 1	An
CO - 2	Predict the splitting pattern of organic compounds by NMR spectroscopy	PSO - 2	C
CO - 3	Deduce the structure of organic compounds using various spectroscopic techniques	PSO - 3	An
CO - 4	Elucidate the structure of heterocyclic compounds.	PSO - 4	An
CO - 5	Design the synthesis of organic compounds	PSO - 3	C

Semester : III Major Core VIII
Name of the Course : Physical Chemistry III
Course code : PG1732

CO No.	Course Outcomes Upon completion of this course, the students will be able to:	PSO Addressed	CL
CO - 1	Construct character table for different point groups	PSO - 1	C
CO - 2	Apply group theory to molecules	PSO - 4	Ap
CO - 3	Generalize the characteristics of rotational spectra for diatomic and polyatomic molecules	PSO - 3	Ap
CO - 4	Determine the molecular mass of polymers and kinetics of polymerization	PSO - 4	An
CO - 5	Compare the experimental techniques related to radiation chemistry	PSO - 6	An

Semester : III Elective III (a)
Name of the Course : Advanced Topics in Chemistry
Course code : PG1733

CO No.	Course Outcomes Upon completion of this course, the students will be able to:	PSO Addressed	CL
CO - 1	Synthesize nanoparticles, nanoshells and nanosensors	PSO - 3	C
CO - 2	Design chemical reactions using green chemistry techniques	PSO - 3	C
CO - 3	Apply supramolecular interactions in organic and photochemisty	PSO - 4	Ap
CO - 4	Develop the synthesis and therapeutic action of drugs	PSO - 3	C
CO - 5	Apply thermodynamics in biological systems	PSO - 6	Ap

Semester : III Elective III (b)
Name of the Course : Medicinal Chemistry
Course code : PG1734

CO No.	Upon completion of this course, the students will be able to:	PSO Addressed	CL
CO - 1	Interpret the nomenclature of the drugs	PSO - 1	Ap
CO - 2	Infer the mechanism of drug action	PSO - 1	An
CO - 3	Determine the chemical constituents present in drugs and its therapeutic values	PSO - 2	An
CO - 4	Analyse insect borne, air borne and water borne diseases	PSO - 6	An
CO - 5	Demonstrate blood grouping and related test	PSO - 5	Ap
CO - 6	Diagnose the causes and treatment of anemia, blood pressure, cancer and AIDS	PSO - 5	An

Semester : IV Major Core IX
Name of the Course : Organic Chemistry IV
Course code : PG1741

CO No.	Upon completion of this course, the students will be able to:	PSO Addressed	CL
CO - 1	Design the synthesis of organic compounds by disconnection approach	PSO - 3	U
CO - 2	Elucidate the structure of alkaloids	PSO - 2	An
CO - 3	Predict the mechanism of molecular rearrangements	PSO - 4	C
CO - 4	Interpret the mechanism of various photochemical reactions	PSO - 3	Ap
CO - 5	Predict the various reaction conditions in pericyclic reaction	PSO - 1	C

Semester : IV Major Core X
Name of the Course : Inorganic Chemistry III
Course code : PG1742

CO No.	Course Outcomes Upon completion of this course, the students will be able to:	PSO Addressed	CL
CO - 1	Interpret NMR and ESR Spectroscopy to study the molecular structure and characterize the inorganic compounds.	PSO - 3	Ap
CO - 2	Analyze the properties of compounds using Mossbauer Spectroscopy	PSO - 2	An
CO - 3	Generalize the characteristics and reactions of Non- aqueous solvents	PSO - 1	Ap
CO - 4	Organize the basic acid base concepts of non aqueous solvents	PSO - 1	C
CO - 5	Determine the electrical and magnetic properties of solids	PSO - 4	An
CO - 6	Assess the role of different elements in biological systems.	PSO - 6	E

Semester : IV Major Core XI
Name of the Course : Physical Chemistry IV
Course code : PG1743

CO No.	Course Outcomes Upon completion of this course, the students will be able to:	PSO Addressed	CL
CO - 1	Enumerate the advances of electrochemistry	PSO - 1	C
CO - 2	Employ the role of nanomaterials as catalyst	PSO - 4	Ap
CO - 3	Generalize the principle, theory and applications of electronic and nuclear magnetic resonance spectroscopy	PSO - 3	Ap
CO - 4	Compare the theory and experimental techniques of ESR and Laser Raman Spectroscopy	PSO - 3	An
CO - 5	Categorize the advantages of lasers in Raman spectroscopy.	PSO - 4	An
CO - 6	Distinguish the structures of various crystal lattices	PSO - 1	An

Semester : IV Elective IV (a)
Name of the Course : Energy for the Future
Course code : PG1744

CO No.	Course Outcomes Upon completion of this course, the students will be able to:	PSO Addressed	CL
CO - 1	Differentiate conventional and non-conventional energy sources	PSO - 2	An
CO - 2	Identify solar radiations and its measurement	PSO - 1	An
CO - 3	Generalize wind energy conversion and its applications	PSO - 4	Ap
CO - 4	Detect biomass conversion techniques and biogas generation	PSO - 4	An
CO - 5	Prepare biogas from plant waste	PSO - 5	C
CO - 6	Interpret applications of fuel cell and hydrogen energy	PSO - 3	Ap

Semester : IV Elective IV (b)
Name of the Course : Nanochemistry
Course code : PG1745

CO No.	Course Outcomes Upon completion of this course, the students will be able to:	PSO Addressed	CL
CO - 1	Generalize the basic concept of nanochemistry	PSO - 1	Ap
CO - 2	Synthesise nanomaterials and nanoshells	PSO - 3	An
CO - 3	Predict the surface morphology of nanomaterials	PSO - 4	An
CO - 4	Synthesize carbon nanoclusters	PSO - 3	C
CO - 5	Apply nanotechnology and nanodevices in biological system	PSO - 6	Ap

Semester : IV Practical III
Name of the Course : Gravimetric analysis and Inorganic preparations
Course code : PG17P3

CO No.	Upon completion of this course, the students will be able to:	PSO Addressed	CL
CO - 1	Separate metal ions in a mixture	PSO - 1	An
CO - 2	Estimate metal ions in a mixture by volumetric methods	PSO - 2	An
CO - 3	Estimate metal ions in a mixture by gravimetricmethods	PSO - 2	An
CO - 4	Prepare Inorganic complexes	PSO - 3	An

Semester : IV Practical IV
Name of the Course : Physical Chemistry Practical
Course code : PG17P4

CO No.	Upon completion of this course, the students will be able to:	PSO Addressed	CL
CO - 1	Determination of solubility product of sparingly soluble salts	PSO - 1	An
CO - 2	Calculate the dissociation constant of a weak acid	PSO - 4	An
CO - 3	Determine the strength of solutions by redox and precipitation titrations	PSO - 2	An
CO - 4	Analyze the strength of acids by adsorption method	PSO - 2	An
CO - 5	Evaluate the conductance of acids in a mixture	PSO - 4	An
CO - 6	Determine the heat of solution by thermometric Experiments	PSO - 6	An