Department of Chemistry

Evaluation Scheme of Undergraduate & Post Graduate Program as per NEP-2020 Guidelines

B.Sc. (Hons) Chemistry Four Year program with Double Majors (Physics/Mathematics/Zoology/Botany)

w.e.f. Session 2024-25

B.Sc. (Hons) Chemistry with Mathematics **Year: Third/ Semester: Fifth (Odd Semester)**

S. N.	Course Code	Course Title	Theory (T) / Practical (P)	Course Type	Periods/ Per week			Continuous Assessment			End Semester Examination (ESE)	Subject Total	Total Credit Points	Attributes							United Nations Sustainable Development Goals (SDGs)
					Lecture (L)	Tutorial (T)	Practical (P)	Class Test (CT)	Teacher Assessment (TA)	Total				Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
1	B030501T/MT320	Group and Ring Theory & Linear Algebra	T	Core Major	4	1	0	15	10	25	75	100	05								-
2	• B030502T/MT321 OR • B030503T/MT322 OR • B030504T/MT323	• Number Theory & Game Theory OR • Graph Theory & Discrete Mathematics OR • Differential Geometry & Tensor Analysis	T		4	1	0	15	10	25	75	100	05								-
3	B020501T/CH337	Organic Synthesis-A	T		3	1	0	15	10	25	75	100	04	✓	✓	✓		✓		✓	
4	B020502T/CH338	Rearrangements and Chemistry of Group Elements	T		3	1	0	15	10	25	75	100	04	✓	✓	✓		✓		✓	
5	B020503P/CH339	Qualitative Analysis	P		0	0	4	15	10	25	75	100	02	✓	✓	✓		✓	✓	✓	
TOTAL					**14**	**4**	**04**	**75**	**50**	**125**	**375**	**500**	**20**								

Department of Chemistry

Evaluation Scheme of Undergraduate & Post Graduate Program as per NEP-2020 Guidelines

B.Sc. (Hons) Chemistry Four Year program with Double Majors (Physics/Mathematics/Zoology/Botany)

w.e.f. Session 2024-25

B.Sc. (Hons) Chemistry with Physics **Year: Third/ Semester: Fifth (Odd Semester)**

S. N.	Course Code	Course Title	Theory (T) / Practical (P)	Course Type	Periods/ Per week			Continuous Assessment			End Semester Examination (ESE)	Subject Total	Total Credit Points	Attributes							United Nations Sustainable Development Goals (SDGs)
					Lecture (L)	Tutorial (T)	Practical (P)	Class Test (CT)	Teacher Assessment (TA)	Total				Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
1	B010501T/PY311	Classical & Statistical Mechanics	T	Core Major	3	1	0	15	10	25	75	100	04								
2	B010502T/PY312	Quantum Mechanics & Spectroscopy	T		3	1	0	15	10	25	75	100	04								
3	B020501T/CH337	Organic Synthesis-A	T		3	1	0	15	10	25	75	100	04	✓	✓	✓		✓		✓	
4	B020502T/CH338	Rearrangements and Chemistry of Group Elements	T		3	1	0	15	10	25	75	100	04	✓	✓	✓		✓	✓	✓	
5	B010503P/PY313	Demonstrative Aspects of Optics & Lasers	P		0	0	4	15	10	25	75	100	02								
6	B020503P/CH339	Qualitative Analysis	P		0	0	4	15	10	25	75	100	02	✓	✓	✓		✓	✓	✓	
TOTAL					**12**	**4**	**08**	**90**	**60**	**150**	**450**	**600**	**20**								

Department of Chemistry

Evaluation Scheme of Undergraduate & Post Graduate Program as per NEP-2020 Guidelines

B.Sc. (Hons) Chemistry Four Year program with Double Majors (Physics/Mathematics/Zoology/Botany)

w.e.f. Session 2024-25

B.Sc. (Hons) Chemistry with Zoology **Year: Third/ Semester: Fifth (Odd Semester)**

S. N.	Course Code	Course Title	Theory (T) / Practical (P)	Course Type	Periods/ Per week			Continuous Assessment			End Semester Examination (ESE)	Subject Total	Total Credit Points	Attributes							United Nations Sustainable Development Goals (SDGs)
					Lecture (L)	Tutorial (T)	Practical (P)	Class Test (CT)	Teacher Assessment (TA)	Total				Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
1	B050501T/BS367	Diversity of Non-Chordates, Parasitology and Economic Zoology	T	Core Major	3	1	0	15	10	25	75	100	04								
2	B050502T/BS368	Diversity of Chordates and Comparative Anatomy (T-4)	T		3	1	0	15	10	25	75	100	04								
3	B020501T/CH337	Organic Synthesis-A	T		3	1	0	15	10	25	75	100	04	✓	✓	✓		✓		✓	4 QUALITY EDUCATION
4	B020502T/CH338	Rearrangements and Chemistry of Group Elements	T		3	1	0	15	10	25	75	100	04	✓	✓	✓		✓	✓	✓	4 QUALITY EDUCATION
5	B050503P/BS369	Lab on Virtual Dissection, Anatomy, Economic Zoology and Parasitology	P		0	0	4	15	10	25	75	100	02								
6	B020503P/CH339	Qualitative Analysis	P		0	0	4	15	10	25	75	100	02	✓	✓	✓		✓	✓	✓	4 QUALITY EDUCATION
TOTAL					**12**	**4**	**08**	**90**	**60**	**150**	**450**	**600**	**20**								

Department of Chemistry

Evaluation Scheme of Undergraduate & Post Graduate Program as per NEP-2020 Guidelines

B.Sc. (Hons) Chemistry Four Year program with Double Majors (Physics/Mathematics/Zoology/Botany)

w.e.f. Session 2024-25

B.Sc. (Hons) Chemistry with Botany **Year: Third/ Semester: Fifth (Odd Semester)**

S. N.	Course Code	Course Title	Theory (T) / Practical (P)	Course Type	Periods/ Per week			Continuous Assessment			End Semester Examination (ESE)	Subject Total	Total Credit Points	Attributes							United Nations Sustainable Development Goals (SDGs)
					Lecture (L)	Tutorial (T)	Practical (P)	Class Test (CT)	Teacher Assessment (TA)	Total				Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
1	B040501T/BS360	Plant Physiology, Metabolism & Biochemistry	T	Core Major	3	1	0	15	10	25	75	100	04								
2	B040502T/BS380	Molecular Biology & Bioinformatics	T		3	1	0	15	10	25	75	100	04								
3	B020501T/CH337	Organic Synthesis-A	T		3	1	0	15	10	25	75	100	04	✓	✓	✓		✓		✓	
4	B020502T/CH338	Rearrangements and Chemistry of Group Elements	T		3	1	0	15	10	25	75	100	04	✓	✓	✓		✓	✓	✓	
5	B040503P/BS381	Experiments in physiology, Biochemistry & molecular Biology	P		0	0	4	15	10	25	75	100	02								
6	B020503P/CH339	Qualitative Analysis	P		0	0	4	15	10	25	75	100	02	✓	✓	✓		✓	✓	✓	
TOTAL					**12**	**4**	**08**	**90**	**60**	**150**	**450**	**600**	**20**								

Effective from Session: 2024-2025							
Course Code	B020501T/CH337	**Title of the Course**	Organic Synthesis A	**L**	**T**	**P**	**C**
Year	Third	**Semester**	Fifth	**3**	**1**	**0**	**4**
Pre-Requisite	Diploma	**Co-requisite**					
Course Objectives	This course aims to equip students with a clear understanding of the preparation, properties, and reaction mechanisms of fundamental organic compounds—including alkanes, cycloalkanes, alkenes, alkynes, arenes, alcohols, phenols, ethers, epoxides, and halides—enabling them to analyze structures, predict reactivity, and apply this knowledge in organic synthesis and related industries.						

Course Outcomes	
CO1	Given the structural and reactive properties of alkanes, alkenes, and alkynes, learners will be able to design and develop stereoselective synthetic pathways by applying advanced concepts of preparation and reactivity.
CO2	For substituted aromatic compounds, learners will be able to evaluate aromaticity, reaction mechanisms, and directing effects to predict and control electrophilic substitution reactions and related transformations.
CO3	Given the structure and methods of formation of alcohols and phenols, learners will be able to analyze their chemical behavior and reaction mechanisms to explain reactivity patterns.
CO4	For a range of epoxide systems, learners will be able to evaluate synthesis strategies, ring-opening mechanisms, and reactivity to predict product outcomes in organic transformations.
CO5	Given the mechanisms of nucleophilic substitution, learners will be able to create and design efficient synthetic routes involving alkyl, aryl, and polyhalogen compounds by applying advanced understanding of their reactivity.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Chemistry of Alkanes	General methods of preparation, physical and chemical properties of alkanes: Wurtz Reaction, Wurtz-Fittig Reactions, Free radical substitutions: Halogenation -relative reactivity and selectivity	8	1
2	Chemistry of Alkenes	Methods of formation of alkenes, Addition to C=C: mechanism (with evidence wherever applicable), reactivity, regioselectivity (Markownikoff and anti-Markownikoff additions) and stereoselectivity; reactions: hydrogenation, halogenation, hydrohalogenation, hydration, oxymercuration demercuration, hydroboration-oxidation, epoxidation, ozonolysis; electrophilic addition to diene (conjugated dienes and allene); radical addition: HBr addition.	12	1
3	Chemistry of Alkynes	Methods of formation of alkynes, Addition to C≡C, mechanism, reactivity, regioselectivity and stereoselectivity; reactions: hydrogenation, halogenations, hydrohalogenation, hydration, oxymercuration demercuration, hydroboration-oxidation.	6	1
4	Aromaticity and Chemistry of Arenes	Nomenclature of benzene derivatives, MO picture of benzene, Aromaticity: Hückel's rule, aromatic character of arenes, cyclic carbocations/carbanions. Electrophilic aromatic substitution: halogenation, nitration, sulphonation and Friedel-Craft's alkylation/acylation with their Mechanism. Directing effects of the groups. Birch reduction, Methods of formation and chemical reactions of alkylbenzenes and alkynylbenzenes.	10	2
5	Chemistry of Alcohol	Classification and nomenclature, Monohydric alcohols – nomenclature, methods of formation by reduction of Aldehydes, Ketones, Carboxylic acids and Esters, Acidic nature, Reactions of alcohols. Dihydric alcohols nomenclature, methods of formation, chemical reactions of vicinal glycols and pinacol pinacolone rearrangement. Trihydric alcohols - nomenclature, methods of formation, chemical reactions of glycerol.	8	3
6	Chemistry of Phenols	Nomenclature, structure and bonding, preparation of phenols, physical properties and acidic character, Comparative acidic strengths of alcohols and phenols, resonance stabilization of phenoxide ion. Reactions of phenols – electrophilic aromatic substitution, acylation and carboxylation. Mechanisms of Fries rearrangement, Claisen rearrangement and Reimer-Tiemann reaction.	6	3
7	Chemistry of Ethers and Epoxides	Nomenclature of ethers and methods of their formation, physical properties, Chemical reactions – cleavage and autoxidation, Ziesel's method. Synthesis of epoxides, Acid and base-catalyzed ring opening of epoxides, orientation of epoxide ring opening, reactions of Grignard and organolithium reagents with epoxides.	5	4
8	Chemistry of Organic Halides	Nomenclature and classes of alkyl halides, methods of formation, chemical reactions, Mechanisms of nucleophilic substitution reactions of alkyl halides, $SN^2$and SN^1 reactions with energy profile diagrams; Polyhalogen compounds : Chloroform, carbon tetrachloride; Methods of formation of aryl halides, nuclear and side chain reactions; Relative reactivities of alkyl halides vs allyl, vinyl and aryl halides.	5	5

Reference Books:

Morrison, R. N. & Boyd, R. N. Organic Chemistry, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).

Sykes, P. A guidebook to Mechanism in Organic Chemistry, Pearson Education, 2003.

Carey, F. A., Guiliano, R. M.Organic Chemistry, Eighth edition, McGraw Hill Education, 2012.

Loudon, G. M. Organic Chemistry, Fourth edition, Oxford University Press, 2008.

Clayden, J., Greeves, N. &Warren, S. Organic Chemistry, 2nd edition, Oxford University Press, 2012

e-Learning Source:

https://nptel.ac.in/courses/104/105/104105033/

https://www.khanacademy.org/science/organic-chemistry/alkanes-cycloalkanes

https://www.khanacademy.org/science/organic-chemistry/alkenes-alkynes

https://nptel.ac.in/courses/104/105/104105033/lec39.pdf

https://www.khanacademy.org/science/organic-chemistry/aromatic-compounds

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)												
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5	SDGs Mapping
CO1	3	3	1	1	2	1	3	3	3	2	2	-	
CO2	3	3	1	1	2	1	3	3	3	2	2	-	
CO3	3	3	1	1	2	1	3	3	3	2	2	-	
CO4	3	3	1	1	2	1	3	3	3	2	2	-	
CO5	3	3	1	1	2	1	3	3	3	2	2	-	

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Effective from Session: 2025-26							
Course Code	B020502T/CH338	**Title of the Course**	Rearrangements and Chemistry of Group Elements	**L**	**T**	**P**	**C**
Year	Third	**Semester**	Fifth	3	1	0	4
Pre-Requisite	Diploma	**Co-requisite**	-				
Course Objectives	The main objective of this course is to provide a comprehensive knowledge of some important rearrangement reactions in Organic Chemistry. Other than that, the concept of catalysis with the help of suitable examples will also be elucidated to the learner. The paper also covers the Chemistry of different elements and a thorough understanding of the s, p, d, and f block elements and their important characteristics. Along with that the applications of some of the important inorganic compounds will also be elaborated. Bioinorganic Chemistry, an important branch of chemistry, will also be introduced to the learner by highlighting the biological role of elements and metalloporphyrins.						

Course Outcomes	
CO1	The learner will be acquainted with some important rearrangement reactions in Organic Chemistry along with their mechanistic insights and factors affecting the rate of the reaction.
CO2	The learner will be able to understand the concept of catalysis and the effect of homo and hetero catalysts and how they impact the overall rate of the reactions. Along with that the concept of enzymatic catalysis will also be introduced.
CO3	The learner will have a thorough understanding of the modern periodic table and different periodic properties. The characteristics of group 1 and 2 elements will also be elaborated. The learner will also be taught the characteristics of p block elements including group 13-18. The anomalous properties of the first element of each group and the diagonal relationship will also be elucidated. A comprehension of the properties of inert gases will also be done. The chemistry of some important inorganic compounds will also be discussed.
CO4	The learner will have a comprehensive understanding of the characteristics of d and f block elements and an insight of important phenomena like lanthanide contraction and its consequences will also be elucidated. The chemistry of some important compounds of d and f block elements will also be discussed
CO5	The concept of bioinorganic chemistry will be introduced to the learner. The importance of essential and trace elements will also be discussed along with their deficiency diseases. The biological role of alkali and alkaline elements will also be elaborated and the physiological functioning of important biomolecules like hemoglobin and myoglobin will also be discussed.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Rearrangement reactions in Organic Chemistry	Mechanistic insights of the following rearrangements: Pinacol-pinacolone, Demjanov, Benzil Bensilic acid, Favorskii, Hoffman, Curtius, Schmidt, Baeyer-Villiger and Fries rearrangement.	8	1
2	Catalysis in Organic Chemistry	General principles and properties of catalysts, homogenous catalysis (catalytic steps and examples) and heterogenous catalysis (catalytic steps and examples) and their industrial applications, Deactivation or regeneration of catalysts. Phase transfer catalysts, Enzyme catalysis; Michaelis-Menten equation, turn-over number.	8	2
3	Periodic properties and Chemistry of s block elements	Modern periodic table and trends in properties like atomic and ionic radii, ionization energy, electron affinity, electronegativity and chemical reactivity. Group - 1 and 2 Elements General introduction, electronic configuration and general trends in physical and chemical properties of elements, anomalous properties of the first element of each group and diagonal relationship.	8	2
4	Chemistry of p block elements	General Introduction: Electronic configuration and general trends in physical and chemical properties of elements anomalous properties of the first element of each group and diagonal relationship. Chemistry of inert gases.	8	3
5	Chemistry of some important compounds	Chemistry of some important compounds like boranes, interhalogens, borohydrides, fullerenes, carbides, fluorocarbons, silicates (structural principle), tetrasulphur tetra nitride	6	3
6	Chemistry of d block elements	General introduction, electronic configuration, and characteristics including ionization energy, oxidation states, atomic radii, colour, catalytic behaviour, and magnetic properties. Preparation, properties and uses of $K_2Cr_2O_7$ and $KMnO_4$.	8	4
7	Chemistry of f block elements	Lanthanides and actinides: General introduction, electronic configuration, and characteristics including ionization energy, oxidation states, atomic radii, colour, and magnetic properties. Lanthanide contraction and its consequences. Preparation, properties and uses of ceric ammonium sulphate	8	4
8	Role of inorganic elements in biology	Essential and trace elements: their role in biological systems, deficiency diseases and toxicity. Synergistic and antagonistic effect. Metalloporphyrins with special reference to heamoglobin and myoglobin. Biological role of alkali and alkaline earth metal ions.	6	5

Reference Books:

Morrison, R. N. & Boyd, R. N. Organic Chemistry, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education). 2. Sykes, P. A guidebook to Mechanism in Organic Chemistry, Pearson Education, 2003.

Lee, J.D. Concise Inorganic Chemistry, Pearson Education 2010

Shriver, D.D. & P. Atkins, Inorganic Chemistry 2nd Ed., Oxford University Press, 1994.

Day, M.C. and Selbin, J. Theoretical Inorganic Chemistry, ACS Publications 1962

R.D.Madan, Principles of Inorganic Chemistry, S CHAND PUBLISHERS

Huheey, J.E., Keiter, E.A., Keiter, R. L., Medhi, O.K. Inorganic Chemistry, Principles of Structure and Reactivity, Pearson Education 2006.

Carey, F. A., Guiliano, R. M.Organic Chemistry, Eighth edition, McGraw Hill Education, 2012.

Clayden, J., Greeves, N. &Warren, S. Organic Chemistry, 2nd edition, Oxford University Press, 2012.

Mukeherji, Singh, Kapoor, Organic Chemistry , Vol 1, New Age International 2014

e-Learning Source:

http://heecontent.upsdc.gov.in/Home.aspx

https://nptel.ac.in/courses/104/106/104106096/
http://heecontent.upsdc.gov.in/Home.aspx
https://nptel.ac.in/courses/104/106/104106096/
https://www2.chemistry.msu.edu/faculty/reusch/VirtTxtJml/intro1.htm

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)												
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5	**SDGs Mapping**
CO1	3	2	1	-	1	-	-	2	-	-	2	3	4 (Quality education)
CO2	2	2	1	-	2	-	-	1	-	-	2	2	
CO3	2	3	1	-	1	-	-	3	-	-	3	2	
CO4	3	2	1	-	1	-	-	2	-	-	2	3	
CO5	2	3	1	-	1	-	2	1	-	-	3	2	

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Effective from Session: 2025-26							
Course Code	B190503P/CH339	**Title of the Course**	Quantitative Analysis	**L**	**T**	**P**	**C**
Year	Third	**Semester**	Fifth	**0**	**0**	**4**	**2**
Pre-Requisite	Diploma	**Co-requisite**	-				
Course Objectives	The main objective of this course is to deliver essential knowledge of laboratory techniques for the analysis of inorganic salts, the identification of functional groups, and the separation of organic mixtures.						

Course Outcomes	
CO1	Learners will be able to understand the laboratory methods and tests related to inorganic mixtures and organic compounds.
CO2	Learners will be able to identify acids and basic radicals in an inorganic mixture.
CO3	Learners will be able to perform and analyse the separation of organic compounds from mixtures.
CO4	Learners will be able to understand the elemental analysis of organic compounds.
CO5	Learners will be able to identify and analyse functional groups in organic compounds and identify organic compounds.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Inorganic Qualitative Analysis	Semi micro-Analysis – cation analysis, separation and identification of ions from Groups I, II, III, IV, V and VI, Anion analysis. Mixture containing 6 radicals-2 +4 or 4+ or 3+3	16	1,2
2	Elemental analysis and identification of functional groups	Detection of extra elements (N, S and halogens) and functional groups (phenolic, carboxylic, carbonyl, esters, carbohydrates, amines, amides, nitro and anilide) in simple organic compounds.	14	2,3
3	Separation of Organic Mixture	Analysis of an organic mixture containing two solid components using water, $NaHCO_3$, NaOH for separation and purification of suitable derivatives	10	2,4
4	Identification of organic compounds	Identification of an organic compound through the functional group analysis, determination of melting point and preparation of suitable derivatives. Identification of the organic compounds by IR and NMR Spectroscopy. (Photocopies of the spectra to be provided to the students)	20	2,5

Reference Books:

Svehla, G. Vogel's Qualitative Inorganic Analysis, Pearson Education, 2012.

Mendham, J. Vogel's Quantitative Chemical Analysis, Pearson, 2009.

Vogel, A.I., Tatchell, A.R., Furnis, B.S., Hannaford, A.J. & Smith, P.W.G., Textbook of practical organic chemistry prentice Hall, 5th edition, 1996

Mann, F.G. & Saunders, B.C. Practical Organic Chemistry Orient-Longman, 1960

Harris, D.C.Exploring Chemical Analysis, 9thEd. New York, W.H. Freeman, 2016

Khopkar, S.M. Basic Concepts of Analytical Chemistry. New Age International Publisher, 2009. Note: For the promotion of Hindi language, course books published in Hindi may be prescribed by the University

e-Learning Source:

https://www.labster.com/chemistry-virtual-labs/

https://www.vlab.co.in/broad-area-chemical-sciences

http://chemcollective.org/vlabs

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)												
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5	SDGs Mapping
CO1	1	2	-	1	2	-	3	2	2	1	-	-	4 (Quality Education)
CO2	2	3	-	1	1	-	2	1	3	2	-	-	
CO3	3	2	-	1	2	-	2	2	2	1	-	-	
CO4	2	3	-	1	1	-	3	2	3	2	-	-	
CO5	3	1	-	1	2	-	3	2	3	3	-	-	

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Department of Chemistry

Evaluation Scheme of Undergraduate & Post Graduate Program as per NEP-2020 Guidelines

B.Sc. (Hons) Chemistry Four Year program with Double Majors (Physics/Mathematics/Zoology/Botany)

w.e.f. Session 2024-25

B.Sc. (Hons) Chemistry with Mathematic **Year: Third/ Semester: Sixth (Even Semester)**

S. N.	Course Code	Course Title	Theory (T) / Practical (P)	Course Type	Periods/ Per week			Continuous Assessment			End Semester Examination (ESE)	Subject Total	Total Credit Points	Attributes							United Nations Sustainable Development Goals (SDGs)
					Lecture (L)	Tutorial (T)	Practical (P)	Class Test (CT)	Teacher Assessment (TA)	Total				Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
1	B030601T/MT324	Metric Space & Complex Analysis	T	Core Major	3	1	0	15	10	25	75	100	04	✓		✓					
2	B030602T/MT325	Numerical Analysis & Operations Research	T		3	1	0	15	10	25	75	100	04	✓		✓					
3	B020601T/CH353	Organic Synthesis-B	T		3	1	0	15	10	25	75	100	04	✓	✓	✓		✓	✓	✓	
4	B020602T/CH354	Chemical Energetics and Radiochemistry	T		3	1	0	15	10	25	75	100	04	✓	✓	✓		✓	✓	✓	
5	• B030603P/MT326 • --	• Practical on Numerical Analysis using Mathematic OR • MATLAB	P		0	0	4	15	10	25	75	100	02	✓		✓					
6	B020603P/CH355	Analytical Methods	P		0	0	4	15	10	25	75	100	02	✓	✓	✓		✓	✓	✓	
TOTAL					**12**	**4**	**08**	**90**	**60**	**150**	**450**	**600**	**20**								

Department of Chemistry

Evaluation Scheme of Undergraduate & Post Graduate Program as per NEP-2020 Guidelines

B.Sc. (Hons) Chemistry Four Year program with Double Majors (Physics/Mathematics/Zoology/Botany)

w.e.f. Session 2024-25

B.Sc. (Hons) Chemistry with Physics **Year: Third/ Semester: Sixth (Even Semester)**

S. N.	Course Code	Course Title	Theory (T) / Practical (P)	Course Type	Periods/ Per week			Continuous Assessment			End Semester Examination (ESE)	Subject Total	Total Credit Points	Attributes							United Nations Sustainable Development Goals (SDGs)
					Lecture (L)	Tutorial (T)	Practical (P)	Class Test (CT)	Teacher Assessment (TA)	Total				Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
1	B010601T/PY314	Solid State & Nuclear Physics	T	Core Major	3	1	0	15	10	25	75	100	04	✓							
2	B010602T/PY315	Analog & Digital Principles & Applications	T		3	1	0	15	10	25	75	100	04	✓							
3	B020601T/CH353	Organic Synthesis-B	T		3	1	0	15	10	25	75	100	04	✓	✓	✓		✓	✓	✓	
4	B020602T/CH354	Chemical Energetics and Radiochemistry	T		3	1	0	15	10	25	75	100	04	✓	✓	✓		✓	✓	✓	
5	B010603P/PY316	Analog & Digital Circuits	P		0	0	4	15	10	25	75	100	02	✓		✓					
6	B020603P/CH355	Analytical Methods	P		0	0	4	15	10	25	75	100	02	✓	✓	✓		✓	✓	✓	
TOTAL					**12**	**4**	**08**	**90**	**60**	**150**	**450**	**600**	**20**								

B.Sc. (Hons) Chemistry with Zoology **Year: Third/ Semester: Sixth (Even Semester)**

S. N.	Course Code	Course Title	Theory (T) / Practical (P)	Course Type	Periods/ Per week			Continuous Assessment			End Semester Examination (ESE)	Subject Total	Total Credit Points	Attributes							United Nations Sustainable Development Goals (SDGs)
					Lecture (L)	Tutorial (T)	Practical (P)	Class Test (CT)	Teacher Assessment (TA)	Total				Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
1	B050601T/BS377	Evolutionary and Developmental Biology	T	Core Major	3	1	0	15	10	25	75	100	04								
2	B050602T/BS378	Ecology, Ethology, Environmental Science and Wildlife	T		3	1	0	15	10	25	75	100	04								
3	B020601T/CH353	Organic Synthesis-B	T		3	1	0	15	10	25	75	100	04	✓	✓	✓		✓	✓	✓	
4	B020602T/CH354	Chemical Energetics and Radiochemistry	T		3	1	0	15	10	25	75	100	04	✓	✓	✓		✓	✓	✓	
5	B050603P/BS509	Lab on Environmental Science, Behavioral Ecology, Developmental Biology, Wildlife, Ethology	P		0	0	4	15	10	25	75	100	02								
6	B020603P/CH355	Analytical Methods	P		0	0	4	15	10	25	75	100	02	✓	✓	✓		✓	✓	✓	
TOTAL					**12**	**4**	**08**	**90**	**60**	**150**	**450**	**600**	**20**								

Department of Chemistry

Evaluation Scheme of Undergraduate & Post Graduate Program as per NEP-2020 Guidelines

B.Sc. (Hons) Chemistry Four Year program with Double Majors (Physics/Mathematics/Zoology/Botany)

w.e.f. Session 2024-25

B.Sc. (Hons) Chemistry with Botany **Year: Third/ Semester: Sixth (Even Semester)**

S. N.	Course Code	Course Title	Theory (T) / Practical (P)	Course Type	Periods/ Per week			Continuous Assessment			End Semester Examination (ESE)	Subject Total	Total Credit Points	Attributes							United Nations Sustainable Development Goals (SDGs)
					Lecture (L)	Tutorial (T)	Practical (P)	Class Test (CT)	Teacher Assessment (TA)	Total				Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
1	B040601T/BS370	Cytogenetics, Plant Breeding & Nanotechnology	T	Core Major	3	1	0	15	10	25	75	100	04								
2	B040602T/BS382	Ecology & Environment	T		3	1	0	15	10	25	75	100	04								
3	B020601T/CH353	Organic Synthesis-B	T		3	1	0	15	10	25	75	100	04	✓	✓	✓		✓	✓	✓	4 QUALITY EDUCATION
4	B020602T/CH354	Chemical Energetics and Radiochemistry	T		3	1	0	15	10	25	75	100	04	✓	✓	✓		✓	✓	✓	4 QUALITY EDUCATION
5	B040603P/BS383	Cytogenetics, Conservation & Environment management	P		0	0	4	15	10	25	75	100	02								
6	B020603P/CH355	Analytical Methods	P		0	0	4	15	10	25	75	100	02	✓	✓	✓		✓	✓	✓	4 QUALITY EDUCATION
TOTAL					**12**	**4**	**08**	**90**	**60**	**150**	**450**	**600**	**20**								

Effective from Session: 2025-26							
Course Code	B020601T/CH353	**Title of the Course**	Organic Synthesis B	**L**	**T**	**P**	**C**
Year	Three	**Semester**	Six	3	1	0	4
Pre-Requisite	Diploma	**Co-requisite**	-				
Course Objectives	This paper provides detailed knowledge of the synthesis of various classes of organic compounds and functional groups through interconversion. Organic synthesis is the most important branch of organic chemistry, which provides jobs in production and QC departments related to chemicals, drugs, medicines, FMCG, etc. industries. The study of natural products and heterocyclic compounds offers an excellent strategy towards identifying novel biological probes for several diseases. Historically, natural products have played an important role in the development of pharmaceutical drugs for a few diseases, including cancer and infection.						

Course Outcomes	
CO1	Learners will be able to perceive the sound knowledge of various reagents for oxidation and reduction in organic synthesis. And understand organomagnesium, organozinc, and organolithium compounds, including their formation and diverse chemical reactions.
CO2	Learners will be able to develop a comprehensive knowledge of aldehydes, ketones, and carboxylic acids. Learn how to name them, make them, what their physical properties are, and how they react to different things. For example, learn how nucleophilic additions work and how to make functional derivative preparations. Achieve proficiency in organic synthesis.
CO3	Learners will be able to develop the knowledge necessary for a proficient understanding of organic synthesis via enolates and the organic chemistry of nitrogen-containing compounds.
CO4	Learners will be able to perceive the sound knowledge and comprehensive understanding of heterocyclic molecular structures, synthesis, reactions, and substitution mechanisms.
CO5	Learners will be able to develop a comprehensive understanding of alkaloids and terpenes: their structures, physiological roles, synthetic methods, and medicinal importance.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Reagents in Organic Synthesis	Oxidation with DDQ, CAN and SeO_2, mCPBA, Jones Oxidation, PCC, PDC, PFC, Collin's reagent and ruthenium tetraoxide. Reduction with $NaBH_4$, $LiAlH_4$, Meerwein-Ponndorf-Verley (MPV) reduction, Wilkinson's catalyst, Birch reduction, DIBAL-H	8	1
2	Organometallic Compounds	Organomagnesium compounds: the Grignard reagents, formation, structure, and chemical reactions. Organozinc compounds: formation and chemical reactions. Organolithium compounds: formation and chemical reactions.	8	1
3	Chemistry of Aldehydes and ketones	Nomenclature and structure of the carbonyl groups, synthesis of aldehydes and ketones with reference to the synthesis of aldehydes from acid chlorides, synthesis of aldehydes and ketones uses 1, 3-dithianes, synthesis of ketones from nitrites and from carboxylic acids, Physical properties. Mechanism of nucleophillic additions to carbonyl group with particular emphasis on benzoin, aldol, Perkin and Knoevenagel condensations, Condensation with ammonia and its derivatives. Wittig reaction, Mannich reaction. Oxidation of aldehydes, Cannizzaro reaction, MPV, Clemmensen, Wolff-Kishner,	8	2
4	Carboxylic acids and their Functional Derivative	Nomenclature and classification of aliphatic and aromatic carboxylic acids. Preparation and reactions. Acidity (effect of substituents on acidity) and salt formation, Reactions: Mechanism of reduction, substitution in alkyl or aryl group. Preparation and properties of dicarboxylic acids such as oxalic, malonic, adipic and phthalic acids and unsaturated carboxylic acids such as acrylic and cinnamic acids, Reactions: Action of heat on hydroxy and amino acids, and saturated dicarboxylic acids, stereospecific addition to maleic and fumaric acids. Preparation and reactions of acid chlorides, acid anhydrides, amides and esters, acid and alkaline hydrolysis of esters, trans-esterification.	6	2
5	Organic Synthesis via Enolates	Acidity of α-hydrogens, alkylation of diethyl malonate and ethyl acetoacetate, Synthesis of ethyl acetoacetate: the Claisen condensation, Keto-enol tautomerism of ethyl acetoacetate. Alkylation of 1, 3-dithianes, Alkylation and acylation of enamines.	8	3
6	Organic Compounds of Nitrogen	Preparation of nitroalkanes and nitroarenes, Chemical reactions of nitroalkanes. Mechanisms of nucleophilic substitution in nitroarenes and their reductions in acidic, neutral and alkaline media, Picric acid. Halonitroarenes: reactivity, Structure and nomenclature of amines, physical properties, Stereochemistry of amines, Preparation of alkyl and aryl amines (reduction of nitro compounds, nitrities), reductive amination of aldehydic and ketonic compounds, Gabriel-phthalimide reaction, Hofmann bromamide reaction.	8	3
7	Heterocyclic Chemistry	Molecular orbital picture and aromatic characteristics of pyrrole, furan, thiophene and pyridine, Methods of synthesis and chemical reactions with particular emphasis on the mechanism of electrophilic substitution, Mechanism of nucleophilic substitution reaction in pyridine derivatives, Comparison of basicity of pyridine, piperidine and pyrrole. Introduction to condensed five and six membered heterocycles,	8	4
8	Natural Products	Alkaloids & Terpenes: Natural occurrence, General structural features, their physiological action, Hoffmann's exhaustive methylation, Emde's modification; Medicinal importance of Nicotine, Quinine, Morphine, Cocaine, and Reserpine. Natural Occurrence and classification of terpenes, isoprene rule.	6	5

Reference Books:

Morrison, R. N. & Boyd, R. N. Organic Chemistry, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).

Sykes, P. A guidebook to Mechanism in Organic Chemistry, Pearson Education, 2003.

Carey, F. A., Guiliano, R. M.Organic Chemistry, Eighth edition, McGraw Hill Education, 2012.

Loudon, G. M. Organic Chemistry, Fourth edition, Oxford University Press, 2008.

Clayden, J., Greeves, N. &Warren, S. Organic Chemistry, 2nd edition, Oxford University Press, 2012.

e-Learning Source:
http://heecontent.upsdc.gov.in/Home.aspx https://nptel.ac.in/courses/104/103/104103111/
https://www2.chemistry.msu.edu/faculty/reusch/VirtTxtJml/intro1.htm https://nptel.ac.in/courses/104/103/104103071/#
https://swayam.gov.in/
http://heecontent.upsdc.gov.in/Home.aspx https://nptel.ac.in/courses/104/103/104103111/
https://www2.chemistry.msu.edu/faculty/reusch/VirtTxtJml/intro1.htm https://nptel.ac.in/courses/104/103/104103071/#

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)												
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5	SDGs Mapping
CO1	3	3	-	-	2	-	-	3	-	2	3	3	4 (Quality education)
CO2	3	3	-	-	2	-	-	3	-	2	2	3	
CO3	3	3	-	-	2	-	-	3	-	2	3	3	
CO4	3	3	-	-	2	-	-	3	-	2	2	3	
CO5	3	3	-	-	2	-	3	3	-	2	3	3	

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Effective from Session: 2025-26							
Course Code	B020602T/CH354	**Title of the Course**	Chemical Energetics and Radio Chemistry	**L**	**T**	**P**	**C**
Year	Third	**Semester**	Six	3	1	0	4
Pre-Requisite	Diploma	**Co-requisite**	-				
Course Objectives	The main aim of this course is to convey fundamental knowledge of the laws of thermodynamics and their applications, phase equilibria of one- and two-component systems, electrochemistry, ionic equilibrium applications of conductivity, and potentiometric measurements. Higher education studies have proven to be quite important. The learner will be able to investigate topics in their appropriate dimensions after completing the course.						

Course Outcomes	
CO1	Learners will be able to perceive the sound knowledge of the first law of thermodynamics and various energies such as internal energy and enthalpy. Students would also gain insight into the knowledge of thermochemistry and various reaction enthalpies. Students gained insight into the laws of thermodynamics, the importance of entropy, and gibbs free energy. Nernst heat theorem, statement, and concept of residual entropy.
CO2	Learners will be able to evaluate the fundamentals of electrochemistry and enhance their knowledge of the basics of electrochemistry, conductometric titrations, and the Ostwald dilution law. Degree of ionization. Students also learn about electrodes, electrochemical cells, pH, buffer solutions, and salt hydrolysis.
CO3	Learners will be able to evaluate the fundamentals of the surface chemistry laws of adsorption and colloids. Students also learn about dilute solutions and colligative properties. It enables us to understand the reactants in catalysis.
CO4	Learners will be able to explain basics of photochemistry, the Jablonski diagram, and different photophysical processes.
CO5	Learners will be able to expalin about radioactivity. It enables us to understand the applications of radiochemistry in energy tapping, dating of objects, neutron activation analysis, isotopic labelling studies, and nuclear medicine.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	First Law of Thermodynamics	Statement, definition of internal energy and enthalpy. Heat capacity,heat capacities at constant volume and pressure and their relationship. Joule's law– Joule Thomson coefficient and inversion temperature. Calculation of w, q, dU & dH for the expansion of ideal gases under isothermal and adiabatic conditions for reversible process. Thermochemistry: Standard state, standard enthalpy of formation – Hess's law of heat summation and its applications. Heat of reaction at constant pressure and at constant volume. Enthalpy of neutralization. Bond dissociation energy and its calculation from thermo-chemical data, temperature dependence of enthalpy. Kirchhoff's equation	8	1
2	Thermodynamics-II	Second Law of Thermodynamics, Need for the law, different statements of the law, Carnot cycle andits efficiency. Carnot theorem. Thermodynamic scale of temperature. Concept of Entropy, Entropy as a state function, entropy as a function of V & T, entropy as a functionof P & T, entropy change in physical change, Clausius inequality, entropy as a criteria of spontaneity and equilibrium. Entropy change in ideal gases and mixing of gases. Gibbs and Helmholtz Functions Gibbs function (G) and Helmhotz work function (A) as thermodynamic quantities. A & G as criteria for thermodynamic equilibrium and spontaneity, their advantage over entropy change, Variation of G and A with P, V and T. Third Law of Thermodynamics; Nernst heat theorem, statement and concept of residual entropy. Nernst distribution law – Thermodynamic derivation, applications	8	1
3	Electrochemistry	Electrical transport:- Conduction in metals and in electrolyte solutions, specificconductance molar and equivalent conductance, measurement of equivalent conductance, variationof molar, equivalent and specific conductances with dilution. Migration of ions and Kohlrausch law, Arrhenius theory of electrolyte dissociation and its limitations. Weak and strong electrolytes . Ostwald's dilution law, its uses and limitations. Debye-Huckel-Onsager equation for strong electrolytes (elementary treatment only). Transport number, definition and determination by Hittorf method and moving boundary method.	7	2
4	Ionic Equilibrium	Electrode reactions, Nernst equation, derivation of cell EMF and single electrode potential, standard hydrogen electrode-reference electrodes and their applications, standard electrode potential, sign conventions, Electrolytic and Galvanic cells–Reversible and irreversible cells, conventional representation of electrochemical cells. EMF of a cell and its measurement. Definitionof pH and pKa , determination of pH using hydrogen, quinhydrone and glass electrodes by potentiometric methods. Buffers – Mechanism of buffer action, Henderson-Hazel equation, application of buffer solution. Hydrolysis of salts.	8	2
5	Surface Chemistry	Adsorption: Physical and chemical adsorption; Freundlich and Langmuir adsorption isotherms; multilayer adsorption and BET isotherm (no derivation required); Gibbs adsorption isothermand surface excess; Heterogenous catalysis (single reactant); Colloids:Lyophobic and lyophilic sols, Origin of charge and stability of lyophobic colloids,Coagulation and Schultz-Hardy rule, Zeta potential and Stern double layer (qualitative idea), Tyndall effect; Electrokinetic phenomena (qualitative idea only); Stability of colloids and zeta potential; Micelle formation	7	3
6	Colligative Properties	Ideal and non-ideal solutions, methods of expressing concentrations of solutions, activity and activity coefficient. Dilute solution, colligative properties, Raoult's law, relative lowering of vapour pressure, molecular weight determination, Osmosis, law of osmotic pressure and its measurement, determination of molecular weight from osmotic pressure, Elevation of boiling point and depression of freezing, Thermodynamic derivation of relation between molecular weight and elevation in boiling point and depression in freezing point. Experimental methods for determining various colligative properties. Abnormal molar mass, Van't Hoff factor, Colligative properties of degree of dissociation and association of solutes.	8	3
7	Photo Chemistry	Interaction of radiation with matter, difference between thermal and photochemical processes. Laws of photochemistry: Grothus- Drapper law, Stark-Einstein law, Jablonski diagramdepicting various processes occurring in the excited state, qualitative description of fluorescence, phosphorescence, non-radiative processes (internal conversion, intersystem crossing), quantumyield, photosensitized reactions – energy transfer processes (simple examples), kinetics of photochemical reaction.	6	4
8	Radiochemistry	Natural and induced radioactivity; radioactive decay-a-decay, b-decay, g-decay; neutromemission, positrom emission, electron capture; unit of radioactivity (Curie); half life period; Geiger-Nuttal rule, radioactive displacement law, radioactive series. Measurement of radioactivity: ionization chamber, Geiger counters scintillation counters. Applications: energy tapping, dating of objects, neutron activation analysis, isotopic labelling studies, nuclear medicine-99mTc radiopharmaceuticals.	8	5

Reference Books:
Peter Atkins & Julio De Paula, Physical Chemistry 9th Ed., Oxford University Press (2010).
Metz, C. R. Physical Chemistry 2nd Ed., Tata McGraw-Hill (2009).
Atkins, P. W. & Paula, J. de Atkin's Physical Chemistry Ed., Oxford University Press 13 (2006).
Castellan, G. W. Physical Chemistry 4th Edn. Narosa (2004).
e-Learning Source:
https://www.mooc-list.com/tags/physical-chemistry
https://www2.chemistry.msu.edu/faculty/reusch/VirtTxtJml/intro1.htm
https://www.coursera.org/learn/physical-chemistry

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)												
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5	SDGs Mapping
CO1	3	3	-	-	-	-	2	3	-	-	2	3	4 (Quality Education)
CO2	3	3	-	-	-	-	2	3	-	-	2	3	
CO3	3	3	-	-	-	-	2	3	-	-	2	3	
CO4	3	3	-	-	-	-	3	3	-	-	2	3	
CO5	3	3	-	-	-	-	3	3	-	-	2	3	

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**

Effective from Session: 2025-26							
Course Code	B020603P/CH355	**Title of the Course**	Analytical Methods	**L**	**T**	**P**	**C**
Year	Third	**Semester**	Six	**0**	**0**	**4**	**2**
Pre-Requisite	10+2	**Co-requisite**	-				
Course Objectives	The main objective of this course is to provide essential knowledge of laboratory techniques and tests for estimating metal ions and chromatographic separation of amino acids and sugars. The lab course also delivers knowledge and experimentation-based understanding of the ionization enthalpies of acids and bases.						

Course Outcomes	
CO1	Learners will be able to learn about laboratory methods and tests related to the estimation of metal ions and gravimetric analysis.
CO2	Learners will be able to understand and evaluate the chromatography separation and perform the paper chromatography experimentation.
CO3	Learners will be able to remember, understand, and perform the thin layer chromatography experimentation.
CO4	Learners will be able to understand the solubility behavior of compounds at different temperatures.
CO5	Learners will be able to understand, analyze, and perform experiments related to the enthalpy of neutralizing acids and bases and lattice energy calculations.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Gravimetric Analysis	Estimation of one anion and cation in a given salt: 1. Analysis of Cu as CuSCN, 2. Analysis of Ni as Ni(dimethylgloxime) 3. Analysis of Ba asBaSO4	15	1
2	Paper Chromatography	Ascending and Circular Rf of organic compounds, Separation of a mixture of phenylalanine and glycine. Alanine and aspartic acid Leucine and glutamic acid. Spray reagent ninhydrin. Separation of a mixture of D, L alanine, glycine, and L-leucine using n-butanol:acetic acid: water (4:1:5). Spray reagent ninhydrin. Separation of monosaccharaides a mixture of D- galactose and D –fructose using n- butanol: acetone: water (4:5:1). Spray reagent aniline hydrogen phthalate	15	2,3
3	Thin Layer Chromatography	Determination of Rf values and identification of organic compounds: Separation of green leaf pigments (spinach leaves may be used) Preparation of separation of 2,4- dinitro phenyl hydrazones of acetone, 2- butanone, hexan-2, and 3-one using toluene and light petroleum (40:60), Separation of a mixture of dyes using cyclohexane and ethyl acetate (8.5:1.5)	15	2,3
4	Thermochemistry	To determine the solubility of benzoic acid at different temperatures and to determine H of the dissolution process. To determine the enthalpy of neutralization of a weak acid/weak base versus strong base/strong acid and determine the enthalpy of ionization of the weak acid/weak base. To determine the enthalpy of solution of solid calcium chloride and calculate the lattice energy of calcium chloride from its enthalpy data using Born-Haber cycle.	15	4,5

Reference Books:

Practical Chemistry: For B.Sc, S. Chand Limited, OP pandey, DN Bajpai, 2022.

Khopkar, S.M. Basic Concepts of Analytical Chemistry. New Age International Publisher, 2009.

B.Sc.-III Practical Chemistry, Dr. Pradip P. Deohate, ISBN : 978-93-5445-764-7

Instrumental Methods of Analysis, CBS Publishers & Distributors, Willard M.H., ISBN 9788123909431

e-Learning Source:

https://youtu.be/UHYfgwjE2i4

http://zd2.chem.uni.wroc.pl/files/chemistry/10A_ENG.pdf

https://ncert.nic.in/pdf/publication/sciencelaboratorymanuals/classXII/chemistry/lelm103.pdf

https://rltsc.edu.in/wp-content/uploads/2021/03/E-Book-B.Sc_.-III-Practical-Chemistry.pdf

Course Articulation Matrix: (Mapping of COs with POs and PSOs)

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3	PSO4	PSO5	SDGs Mapping
CO1	2	2	-	-	-	-	1	-	2	1	-	-	4 (Quality Education)
CO2	2	3	-	-	-	-	2	-	3	2	-	-	
CO3	2	2	-	-	-	-	2	-	2	1	-	-	
CO4	3	3	-	-	-	-	1	-	3	2	-	-	
CO5	3	1	-	-	-	-	1	-	3	3	-	-	

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Name & Sign of Program Coordinator	**Sign & Seal of HoD**